

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Lechner Coal Mining Machine.

The advantages of using machinery for undercutting coal are generally well understood. The work is concentrated in the mines, requiring a less number of rooms to produce a given number of tons of lump coal as compared with hand labor. There is a reduction of dead work. Less track is necessary to lay to the several rooms because of the concentration. A less number of boys and horses are necessary for gathering purposes. There is also a saving in the better condition of the coal. Our engravings represent a coal-mining machine which has been successfully introduced both in this country and in England. There are several special advantages attending its use, while some of the details of construction are interesting, not only as explaining this machine, but on account of their applicability in other directions. Fig. 1 represents the machine at rest, while Fig. 2 shows its operation and Fig. 3 the details of the endless chain which drives the cutter-bar at the extreme front. The general features of the machine and the method of operation are so clearly shown in the engraving that only a brief description is necessary. The driving mechanism consists of two small engines, placed at the sides and back of the machine, operated by compressed air. By means of suitable gearing the reciprocating motion thus obtained is converted to rotary motion operating screws which drive forward the cutter-bar. The motion is also changed in direction so as to drive the chains which revolve the cutter-bar. By means of a peculiar clutch and reversing gear, the motion may be instantly changed and the cutter-bar withdrawn at a considerably more rapid rate than that at which it is driven forward. The machine is placed in position in the mine in the manner shown in Fig. 2. The cutter-bar is driven into the coal a distance of 5 feet. When worked to the limit of the machine it is withdrawn and another cut is made at the side of the first, the operations being continued in this way until the entire room of the mine is undercut, when the machine is moved and put in operation elsewhere. The dimensions of the parts are such that the machine will work in veins as thin as 20 inches. By inspection of the engravings it will be seen that the cutter-bar is provided with a series of knives, which are so placed that at each revolution of the bar every part of the channel is touched by one or another of them. The cutting is regular in its progress, while the spaces between the knives provide room for the cuttings to fall. These are carried to the rear by means of scraper chains, shown in the engravings. The cutter bars, as ordinarily constructed, are 3 feet long. Only 4 inches of coal are consumed in the use of this machine, while 8 to 12 inches are wasted by hand labor. Where the vein is underlaid with fire-clay the cut may be made in it as suggested by Fig. 2, thus saving all the coal. The machine is also adapted to cutting on different levels, either on the bottom or higher.

The special advantages claimed for this machine are that it requires no track, is easily and quickly handled by two men, drives all entrances and turns rooms. It attacks the coal from the front and is free from cross strain. The power is applied direct. One air compressor is sufficient to drive four machines. One of the essential features of this device is the endless chain which drives the cutter-bar already mentioned. It is described by the manufacturers as an anti-friction roller chain, and is adapted, under special circumstances, for taking the place of belting, shafting and cog-wheel gear. The special advantages claimed for it by the inventor are its great strength and durability and its positive motion. There is no slipping on the sprocket. When pulling as high as 20,000 pounds on the under side it will run slack on the upper side, always dropping over the sprocket and never climbing. The inventor recommends the chain for use in river steamboats, taking the place of shafting or belting, which are objectionable for driving side and stern water wheels. It is also applicable to elevators and hoists, for running shafting in machine shops, for use in agricultural machinery, in coal shafts, in nut-coal screens and for roller trains in rolling and rail mills. The general features of this chain are shown in Fig. 3. The roller on the rivet between the links greatly lessens the friction and is the feature upon which the manufacturers lay special stress.

Trial of a Torpedo Boat.—A "double-barrel" second-class Thorneycroft torpedo-boat was recently tested in England with the view of ascertaining the practicability of using steam instead of compressed air for the purpose of ejecting the Whitehead torpedo. The principle was some years ago submitted to the Constructive Department of the Admiralty by Messrs. Yarrow, of Poplar, but it had not hitherto been applied to the service. Several good runs were made with the torpedo, the force of the impulse being about the same as is obtained by the usual means. The new system has no practical advantages, so far as ships and first-class torpedo craft are concerned, which are necessarily fitted with air-compressing machinery for charging the air chamber of the projectiles; but as the torpedoes are supplied to the smaller craft ready charged, the new system of discharging will enable air pumps and receivers to be dispensed with, so that the result will be an important reduction of gear and weight.

Mineral Wealth of Russia.

According to the report of Sub-Director Skalkowsky, of the Russian Department of Mines, the yearly production of pig iron for the period of five years, from 1874 to 1878, was 405,342 tons, and in 1879, 425,384 tons, showing an increase of only 15,113 tons over that of the previous year, and of 20,042 tons over the average of the preceding five-yearly period. While the production of pig iron has thus remained stationary, that of finished iron has actually decreased, though this is chiefly owing to the increasing make of steel. The diminution in the make of iron in 1879, with respect to the above-named period, was 585 tons. The great increase in the make of

The production of tin in 1879 amounted to only 2 tons, rather less than in the preceding year. Zinc, of which 4337 tons were produced per annum on an average of five years previous to 1879, fell off in that year to 4236 tons, the diminution of 101 tons being due to a lack of orders. Copper also showed a decrease from 3406 tons, the yearly average of the quinquennial period, to 3064 tons in 1879, owing chiefly to slackness in the Wysk establishments. Lead, on the contrary, showed an increase of 321 tons, the figures being 1331 tons in 1879, and 1010 tons for an average of five years previously. No graphite or nickel were extracted in 1879, absence of demand preventing the development of the mines. At Rewdinsk, the only

private individuals was 1522 in Eastern Siberia, 291 in Western Siberia, and 1233 in the Ural, making a total of 3046. The production of gold, which was 32 tons in 1874, rose to 41 tons in 1878, and 42 tons in 1879, showing an increase of 6 tons over the five-yearly average. Silver, found in Tomsk, and in the basins of the Baikal and Terek, shows an increase of 6½ cwt. over this average, the production for 1879 being 11 tons. Platinum, found in Perm and Orenburg, was raised in 1874 to the amount of 2 tons, with a yearly average of about 1 ton 15 cwt.; in 1879 the production was 2 tons 5 cwt., showing an increase of half a ton. The quantity of coal, lignite and anthracite raised in 1879 amounted to 2,864,534 tons, showing an in-

crease of 1,069,013 tons over the average of the five preceding years. Naphtha showed a steady increase from 83,711 tons in 1874 to 246,281 tons in 1878, the yearly average being 167,642 tons. The production in 1879 was 345,149 tons, giving an increase of 177,507 tons over the average, due in a great measure to the extended use of the substance and the diminution of stocks. It will be seen from these figures that the amounts of metals produced have been characterized by a steady increase, notwithstanding which, however, Russia is far from supplying her own increasing consumption from internal sources.

The buildings used for the late exposition at Atlanta have been sold for \$25,000. A powerful company of capitalists has been organized, and negotiations set on foot with

the city for the purchase of the exposition grounds, known as Oglethorpe Park, used for State Fairs, and should satisfactory arrangements be made, the purpose of the company is to begin improvements at once, with an estimated outlay of \$40,000. The main building will be used as a cotton factory, and others will be erected for the manufacture of yarns, &c., a fertilizer factory and various other industries. The company represents \$10,000,000 of capital, the majority local.

Taxation in Europe.

Some British Parliamentary papers, lately published, furnish some interesting information respecting the total amount of taxes levied in each of the different European States. Such returns have not been compiled for 18 years, and they are furnished from reports specially forwarded by the various British representatives. The following is an abstract:

Austria.—State taxes, 1879-80—direct, £7,762,553; indirect, £21,496,978; miscellaneous revenue, £4,726,447—total, £33,985,979. Population, 22,130,684.

Belgium.—State taxes, 1880, £6,144,556; taxes of the nine provinces, 1880, £335,150; taxes of the 2752 communes, 1875, £1,880,441—total, £8,360,137. Population, 5,476,939.

Denmark.—State taxes, 1879-80—direct taxes, £504,100; indirect taxes, £1,680,376; miscellaneous (Faroe Islands) £2550—total, £2,187,026. Population, Denmark proper, 1,969,039; Faroe Islands, 11,220.

France.—State taxes (estimated) for 1881—direct taxes, £16,112,230; indirect taxes, £77,519,024; miscellaneous, £1,511,920; other revenues from State property, £12,160,792—total, £107,303,975. According to the census of 1876, the population consisted then of 36,905,788 souls.

Germany.—The net revenue of the German Empire for the financial year 1880-81 (from the estimates) is set down at £33,312,406 (indirect), the population being 44,756,580.

Italy.—State taxes, 1880—direct, £14,453,748; indirect, £27,265,017; total, £41,718,765, increased by revenues from State property to £46,585,277, and by "extraordinary revenue" to £54,740,881. The population at the end of 1878 was estimated at 28,209,620.

Portugal.—State taxes, 1880-81—direct, £1,249,500; indirect, £3,771,000; total, £5,020,500. The population was given from the last census, January, 1878, as follows: The Continent, 4,160,315; adjacent islands, 362,289; together, 4,522,604.

Spain.—State taxes, 1880-81—direct, £10,551,640; indirect, £17,894,920; total, £28,446,560. Population, according to census of 1877, 16,000,000.

Russia.—State taxes, 1878—direct, £12,338,203; indirect, £36,559,815; total, £48,898,018. The population of the Empire in 1878 was computed at 81,745,307, from which 9,053,139 should be excluded as representing Finland, the Caucasus and Russian possessions in Central Asia.

Sweden.—State taxes, 1877—direct, £651,048; indirect, £2,686,983; total, £3,338,036. The grand total was £6,203,625. The population, from the census of 1877, was 4,484,542.

A Monster Locomotive.—A large engine planned for use over the heavy grade of Tehachapi pass, on the Southern Pacific Railroad, is now being constructed at the railroad shops in Sacramento, Cal. It will run only between Caliente and Nojave, a distance of forty-five miles, and will be the heaviest and most powerful railroad engine in the United States. Its weight will be, when in running order, about 60 tons, or about one-half greater than the present strongest engines. This is exclusive of tender; including the latter, and the fuel and water for use, the weight of the engine will be about 90 tons. The hauling capacity will also be one-half greater than any engine now in use by the company, and it is expected it will draw 12 full loaded cars over the pass, as against from 7 to 9 cars—the largest number now taken over the loop by a single engine. It will have four pairs of driving-wheels, 4½ feet in diameter, with open truck forward. Every part is increased in size and strength in proportion to the increased power it is to have. The cylinders are to be 19 inches in diameter, with 30-inch stroke, as against 18 inches diameter and 24-inch stroke, which is the largest the company now have. The boiler will be of peculiar construction, the furnace grate being 9 feet in length, with an extra combustion chamber about 4 feet in length, making the total length of the furnace something over 13 feet. The boiler will contain 107 tubes, 2½ inches in diameter and 12 feet long, and the outside shell will be made of steel 7-16 inch in thickness. A change from the usual style of construction will be made in the rear end of the boiler by projecting it back into the cab a considerable distance, which is done to increase the length of the engine. The top of the portion which extends back into the cab is dropped down, however, about 2 feet, leaving only sufficient room for water and the crown-sheet. This drop will give sufficient room in height for the engineer to stand in the cab, and will also reduce the temperature to which he would otherwise be subjected. It is expected to have the engine completed and ready for a test of its powers early in March.

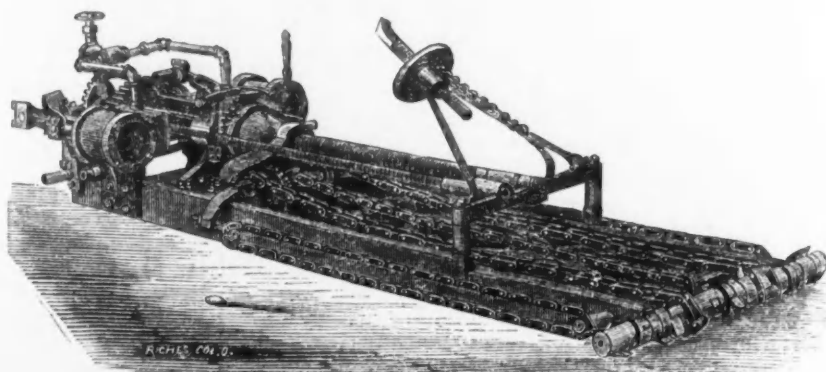


Fig. 1.—General View of the Machine with Cutter Bar Partly Withdrawn.

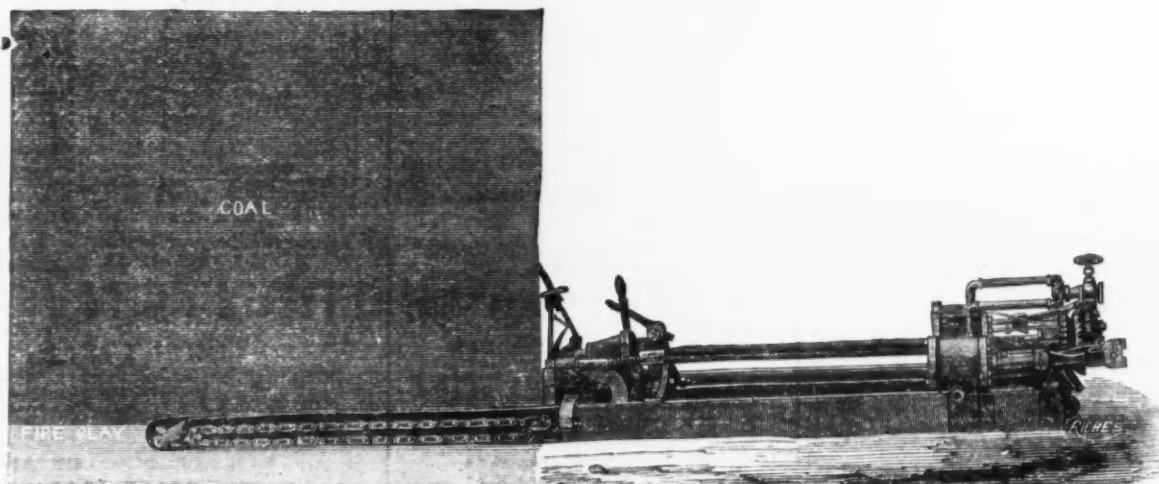


Fig. 2.—The Cutter Bar Extended into the Coal or Fire Clay beneath the Vein.

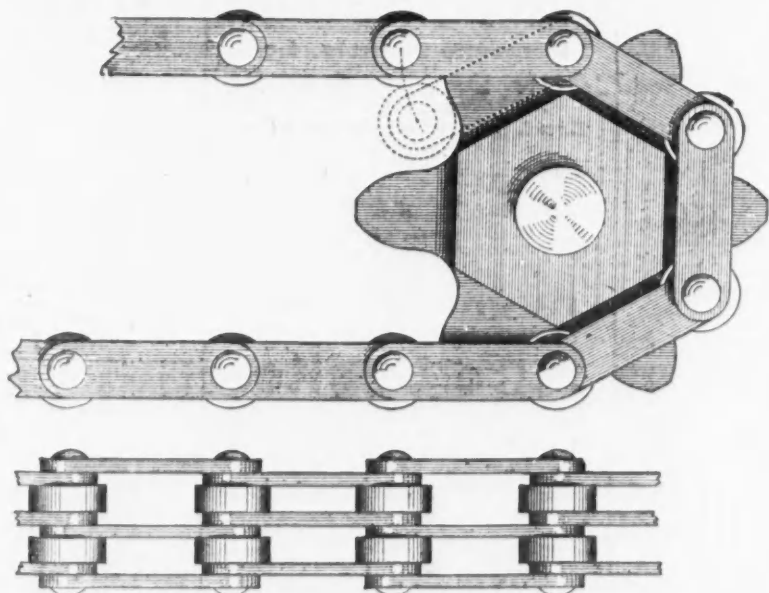


Fig. 3.—Detail of the Sprocket Wheel and Chain Employed to Drive the Cutter Bar.

COAL MINING MACHINE, MANUFACTURED BY THE LECHNER MINING MACHINE COMPANY, COLUMBUS, OHIO.

steel is almost entirely due to the premiums given by the Government, and to numerous orders for the state railways. Special activity was manifested at St. Petersburg, in Poland, in the Ural, and at the Brjansk establishment. The following figures give the output of steel during the period above mentioned: 1874, 8466 tons; 1875, 12,684 tons; 1876, 17,577 tons; 1877, 43,446 tons; 1878, 93,242 tons. This gives a yearly average of 35,083 tons; and in 1879 the quantity was 207,790 tons, showing the enormous increase of 172,707 tons over the average, and 114,548 tons over the figures of the preceding year. With the 14,473 miles of railway open in 1879, large quantities of steel and iron were used in rolling stock, bridges, buildings, &c. A mean annual extraction of 4821 tons of chromate of iron is reported.

nickel works of Russia, only 19 tons of nickel powder and raw nickel were produced in 1879, varying in richness from 21 to 98½ per cent. In 1879, only 15 tons of arsenate of cobalt were raised. The noble metals show a marked and generally steady increase during the period of five years from 1874 to 1878, although the raise of gold has diminished in Eastern Siberia on account of the dearth of provisions, the rise in wages and the cost of transport, the sanding up of several districts, and the draft in Nertschinsk and Tchitinsk. In Western Siberia, however, the raise of gold has increased slightly, and in the Ural considerably, on account of the arrival of a large number of miners at Miassk, and the discovery of several deposits of very rich auriferous sand at Zialkowako-Demarinisk and in Orsk. At the end of 1879, the number of gold mines belonging to

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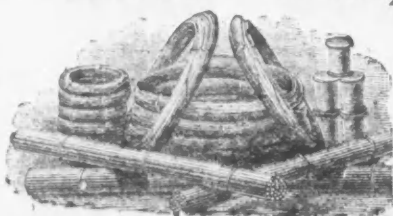
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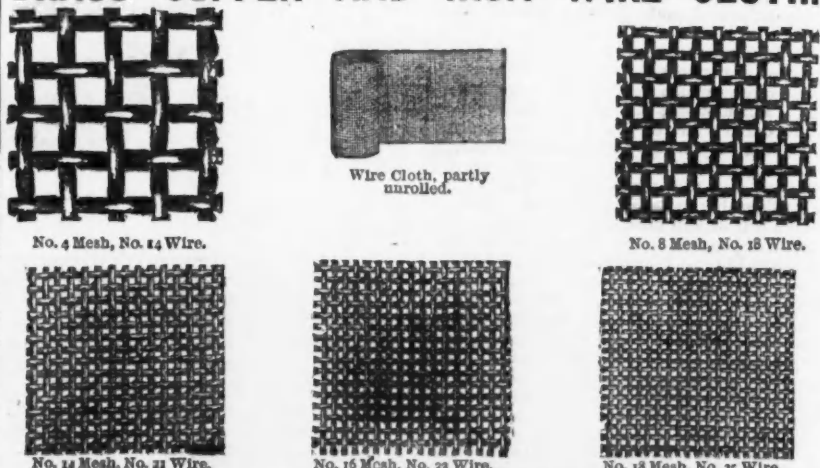
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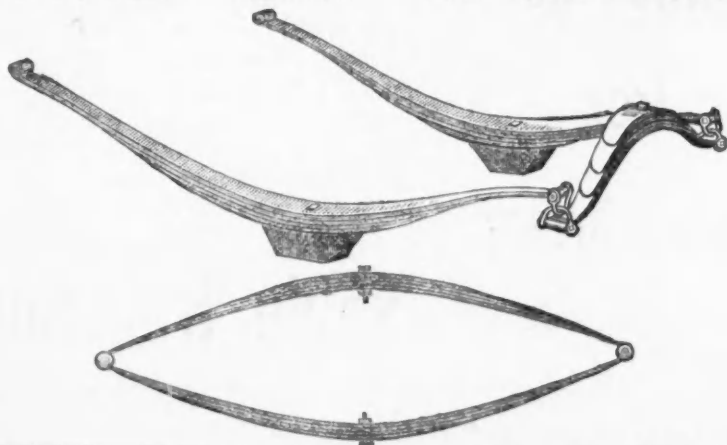
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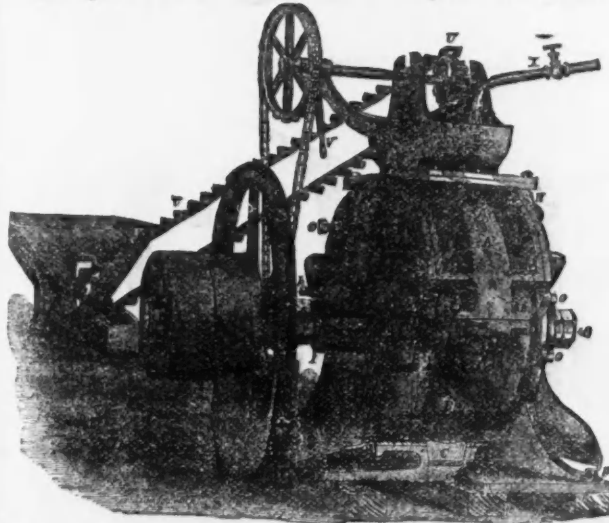
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SCIENTIFIC AND TECHNICAL.

Mr. W. Haddock, of Cincinnati, recently exhibited a working model of a grip cable designed for

STREET CAR PROPULSION.

The cable plans in vogue in San Francisco and Chicago, it is stated, have not given entire satisfaction, and Mr. Haddock sought to improve them and remedy their defects. The invention consists of a box 3 feet deep and 18 inches wide. Brackets project from the sides of this box at intervals of 4 or 5 feet, serving as supports for the stringers upon which the track is laid. The box is constructed of cast iron, in sections 10 or 12 feet in length, so that it can be readily laid and as readily repaired by duplicates, when any portion is out of order. A 3/8-inch slit extends lengthwise through the box, as an opening for the car-grips, which are rods of cast iron or steel, extending from the car to the cable. The latter is 1 1/2-inch thick, and passes around a flat wheel (one being placed at each end of the track), which is worked by a powerful engine. Provision is made for curves and turning corners by the use of a series of upright rollers in the box, standing in a curved line corresponding with the curvature of the track, and around which rollers the cable extends. Lateral rollers are introduced when changes of grade occur, one being placed at the lower end of the hill, and the other at the upper. The car gearing differs materially from that of other cable cars in having two grips, one at either end, and each connected at the forward end of the cars by levers, so that either or both may be dropped by the driver, as occasion may require, in the passage from one track or street car line to another. When a full stop is desired, both grips may be dropped by a pressure of the feet upon the levers, which are on the front platform, and the application of the ordinary brake. Mr. Haddock claims that any car may thus be stopped almost instantaneously. He says that the apparatus may be adapted easily to the bottom of any car now in use, and that the cable may be adapted to any grade. A point of great and growing importance claimed for this system, is the advantage offered for laying telegraph wires underground, the width of the box allowing the passage and insulation of from twenty to thirty wires. As to the box clogging up with dirt, &c., Mr. Haddock stated that the grip-rod would keep the slit clear, while the convexity of the bottom of the box, which is moreover provided with lateral pipes connecting with sewers, would prevent accumulations of water. The plan has attracted the attention of the street railroad men of Cincinnati, and it may be tried as an experiment on some of the lines before many months.

The English Ordnance Committee recently witnessed at Woolwich, England, the trial of

A NEW MACHINE GUN.

for which a merit is claimed for surpassing that of any of its predecessors. It differs from these both in appearance and principle, but, in having ten parallel barrels on a line, it bears a somewhat close resemblance to the well-known French "infernal machine." It is fed by a frame filled with cartridges, 150 in number, and ten in a row. This is dropped into a groove at the breech and worked to and fro by a lever, each movement forward discharging one row of ten shots, and each movement backward withdrawing the empty cases. By a simple mechanism, adjusted before commencing action, and alterable at will, the barrels can be elevated and traversed right and left as it is being fired, and in point of rapidity it has never been excelled, the ten barrels exploding almost simultaneously, and reloading again as quickly as the hand can move. The sample gun under experiment was, however, unfortunately weak in springs provided for firing the percussion caps, and there were consequently a great many misfires.

Recent advices from the Cape Colony, in South Africa, give particulars of the annual gathering of the Cathcart Farmers' Association, which took place at Cathcart on December 8th. A most interesting feature was the trial of agricultural and pumping machinery, among the latter being one of

GWYNNE'S DRIVING ENGINES.

which, with the boiler and one of Messrs. Gwynne's centrifugal pumps, was mounted on a strong cast-iron bed-plate. The boiler is made of steel, which admits of its being worked at a high pressure. The engine is fitted with a heavy fly-wheel, and may be employed in driving corn mills, thrashing machines, &c. The pump is one of Gwynne's 4-inch centrifugal pumps, which swivels to any angle, thus avoiding the necessity of bends and similar adjuncts. The engine and pump were found to work splendidly, throwing a full 4-inch stream; the quantity thrown per hour amounting to about 22,000 gallons. The working of the pump was watched with much interest, and it is stated that Messrs. Gwynne's agents are about to visit farmers in order to consult with them about erecting similar machinery on their farms, this being certainly indicative of agricultural progress at the Cape.

Examinations have at different times been made of

THE PETROLEUM OF THE CAUCASUS, and some results of the investigation of the oil from Zarskiye Kolodzy, in Tiflis, are now known. The wells at this place belong to Messrs. Siemens & Halske, of Berlin, from whom the samples examined were obtained. This petroleum is much lighter than that from Baku, and yields a much larger quantity of volatile fractions. Three specimens were at first obtained, boiling respectively between 30° and 35°, 70° and 75°, and 95° and 100°. From the results of a series of experiments, it appears that the petroleum from Central Caucasus, unlike that from the Caspian Sea, consists essentially of the hydrocarbons $C_{10}H_{22}$ and $C_{11}H_{24}$, like American petroleum, but contains small quantities of the aromatic hydrocarbons $C_{12}H_{26}$ and their addition products $C_{13}H_{28}$. Treatment of the crude petroleum with nitric acid at 1.52 sp. gr. gave volatile crystals, which were obtained in relatively greater quantity from the fraction boiling between 40° and 50°. Recrystallized from alcohol, they appeared as brilliant broad needles, fusing at 95°-96°, insoluble in water, but easily soluble in

boiling alcohol, in ether, petroleum naphtha, carbon disulphide, &c.

The growing necessity for accurate determinations of temperatures above 350° C., and the absence of any satisfactory means of doing this, led Mr. Crafts, in 1875, to propose a

MODIFICATION OF THE AIR THERMOMETER adapted to such uses. A still simpler form of this instrument has since been proposed, the thermometer part consisting of a capillary tube bent twice at right angles. One end of this tube is provided with a bulb of about 1 c. cm. (0.015 cubic inch) capacity, and on the other end is a wider tube about 15 cm. long (about 5.9 inches). At the point where the tube widens is a point of black glass to serve as an index, and in the middle of the wide tube is a glass cock. To the end of this wide tube is attached a rubber tube with two branches, one of which goes to a closed manometer and the other to a rubber bag. The latter, as well as the manometer and the wide tube, are filled with mercury. In order to make an observation, the rubber bag is compressed till the mercury rises to the black glass index and the height of the mercury column in the manometer is noted. The thermometer bulb is then exposed to the temperature to be measured, the column is again adjusted and the new height noted. From these data and the constants of the instrument, the temperature may be calculated. With this apparatus, the boiling point of sulphur was found to be 447°, and that of phosphoric sulphide 527°.

M. Coulon has recently introduced

A NEW PHOTOMETER.

its principle being that a radiometer whose temperature is constant turns solely under the influence of light. The apparatus consists of a radiometer bulb fixed in the middle of a cube-shaped metallic case, having four lateral apertures, closed with glass, through two of which light can be sent horizontally, while the two others allow observation of the bulb. The case is filled with water, which, by spirit lamps, is heated to a temperature above that of the radiant heat of the sources to be measured by about 100°. When a single source of light acts on the bulb from one side, it attracts the white half and repels the black, so that the disk turns edgewise to the light, and presents one side to the observer. If another equal light act simultaneously on the other side and at the same distance as the first, the disk presents its sides to the light and its edge to the observer. Where unequal lights are compared, by moving one of them a proper distance, equality of light is established, and the edge of the disk is turned to the observer. The difference in distance gives the ratio of intensity.

Professor Edlund, of Stockholm, in a memoir presented to the Swedish Academy some time since, has reviewed the results of a long series of experiments made by various physicists, and bearing upon the

ELECTRICAL RESISTANCE OF A VACUUM, his conclusions varying materially from those which have been ordinarily accepted. It has been shown by different experimenters that electricity cannot pass through a nearly perfect vacuum, this being regarded as due not to a sudden increase in resistance of the vacuum itself, but to the resistance of the passage of the electricity from the electrodes to the surrounding medium. Representing by r , the specific resistance in a column of gas of unit length, and by r' the resistance to the passage from the electrode to the medium, then the total resistance for a tube of length l will be $r + r' l$. Professor Edlund argues that experiments prove that as the medium is rarefied the tension of the electricity needed for a discharge diminishes up to a certain limit (depending upon the distance between the electrodes, the width of the tube, surface of the negative electrodes and so on), after which it must increase. As r , for theoretical reasons, diminishes as the rarefaction is increased, this fact just stated can be explained only by assuming that r' increases with the rarefaction; for ordinary pressures r' is very small compared with r , and can be neglected, and then it follows that the tension needed for a discharge is proportional to the distance. As the pressure is diminished r increases and r' decreases, and then the tension necessary for a discharge increases with the distance between the electrodes, but in a smaller ratio. When the rarefaction is great, r can be neglected as compared with r' , and then the tension is independent of the distance. Professor Edlund states various observations confirmatory of these conclusions, and determines finally that "a vacuum is a conductor of electricity," and, further, that the assumption that the presence of ordinary matter is necessary for the passage of the electrical current cannot be maintained.

A new cement for joining leather and other materials is now being introduced into England by the proprietors of the Morris Patent Engineering Works, Birmingham. The article is called

DERMATINE.

and is made from a peculiar preparation of the intestines of animals by a special process worked in Austria, the material being imported into England for the finishing process. Owing to the elasticity of the dermatine, the joints are as pliable as the other parts of the belt, while it is stated that the tensile strength of the cemented joints has been shown by tests to be equal to that of the entire leather. Dermatine is melted and applied the same way as glue, and a considerable saving is effected as against joints made by means of mechanical fastenings.

A series of experimental trials have recently been carried out at the Herp Riding Mills, Stockport, near Manchester, England, with the view of testing

A SMOKE COMBUSTION AIR INJECTOR

invented by Mr. Hall. The air injector is designed specially for use in connection with Mr. Hall's patent revolving furnace bars, but in the trials recently made, ordinary cast-iron bars which had been in use for eighteen months were employed. The boiler with which the experiments were made was an ordinary two-flued Lancashire, 30 feet long, 7 feet diameter, fitted with ten Galloway tubes, working to an average pressure of 80 pounds, and driving an engine at 247 indi-

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from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

SHOE.

**THE VELOCITY OF PROPAGATION OF EXPLOSIVE
PHENOMENA.**

and the results arrived at are of a somewhat
unexpected nature. The experimenters op-
erated chiefly with an explosive mixture of
oxygen and hydrogen at atmospheric pres-
sure, the apparatus employed being a straight
horizontal lead tube, about 133 feet long and
one-fifth-inch interior diameter. This was
filled with the explosive mixture and the
explosion started by means of an electric
spark at one end. The flame as it went
along ruptured two electric circuits by act-
ing each time on a grain of fulminate of
mercury, thus affecting an exceedingly deli-
cate chronometer. When the tube was
arranged in several parallel pieces with bend
joints, the velocity of propagation did not
seem to differ from the velocity in a perfectly
straight tube. The general average for both

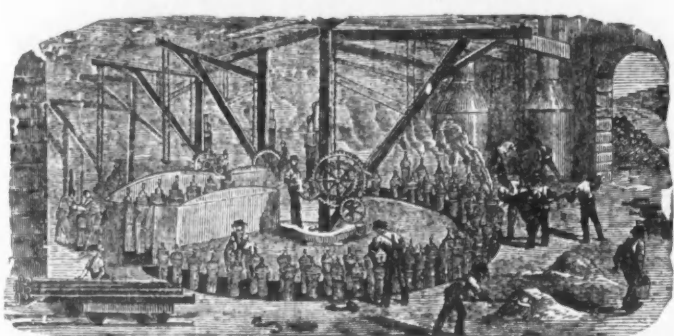
cated horse-power. The fuel used was com-
mon riddled slack, and the trials made were
a very fair test of the capabilities of the ap-
paratus. The air injector is a very simple
arrangement. On the face plate of the boiler
is fixed, on either side of the furnace door, a
perforated circular brass air injector, con-
nected with a piece of ordinary 2-inch piping
extending 2 feet into the flue. Inside the
injector is a narrow tube with a very small
nozzle, and this has a steam connection with
the boiler. A wheel valve enables the in-
jector to be opened or closed at will. When
in operation the steam is admitted through
the small internal tube, and creating a
vacuum inside the pipe causes an inrush of
air through the perforations in the outer por-
tion of the injector fixed upon the face plate
of the boiler. The steam and air come in
contact about half-way up the pipe, and pass-
ing out at the pipe end at a very high tem-
perature—which during the trials was regis-
tered at 125°—commingle with the furnace
gases as they rise from the fire, and before
they get away over the bridge. By this
means a more perfect combustion of the smoke
and gases is secured, there is an increased
draught over the furnace which keeps the
fire clean and bright, and greater heating
power is attained. The trials were made
during one day without the injectors and the
next day with, and although, owing to con-
stant interruptions with the view of affording
illustrations to visitors, a really exact com-
parison of results was not established, the
observations taken of the chimney showed a
very considerable abatement in the quantity
of smoke emitted when the injectors were in
use, and were satisfactory as regarded the
effectiveness of the apparatus as a smoke
consumer. As to its efficiency in econom-
izing the consumption of fuel, there were
no reliable data to go upon; but it is stated
that during previous trials, when the boiler
was worked for two equal periods of 3½
hours with and without the injectors, there
was a gain of 25 per cent. in the amount of
fuel consumed, and a reduction of 60 per
cent. in the quantity of waste ashes, when
the injectors were in operation. Another
important consideration affecting the econ-
omy of the apparatus would, of course, be the
quantity of the steam required to keep up the
blast in the injectors; but this is reported
not to exceed 1 per cent. of the total amount
generated in the boiler. This small loss, if
we may so call it, is, however, more than
balanced by the increased efficiency of the
furnace.
Count C. de Montblanc and Mr. L. Gaul-
ard, of Paris, have invented a

HYDRAULIC TELEGRAPH
based on the combined employment of the
constant pressure exerted by a column of
water of determined height, and on the veloc-
ity of flow in a pipe of the same liquid un-
der a given pressure. If by an opening
formed in a pipe at a distance of 33 feet, for
example, below the level of the reservoir
which supplies it with water, is introduced
a body of slightly smaller section than that
of the pipe, and of a weight less than that of
the column of water which it supports, it
will be displaced with a speed which will be
so much the greater in proportion to its
weight being so much the less. It is upon
these principles that they construct their
hydraulic telegraph for the rapid transmis-
sion of letters or dispatches, and which is
specially intended to connect two stations
separated by a sea or channel. In putting
the invention into practice, they connect the
two stations by a tube of a diameter of 4
inches, for example. This tube is of lead
about four-fifths of an inch thick, and is cov-
ered with an armor formed of iron wire wound
spirally round it, and protected externally by
a wrapping of tanned or tarred hemp. This
arrangement, while enabling the tube to re-
sist the pressure of the column of water,
which, owing to its immersion it has to sup-
port, leaves it sufficient flexibility to allow of
its following the undulations of the ground.
At each of the terminal stations this tube is
put into communication with a water pipe,
whose section or bore is at least equal to it,
and whose source of supply, whether natural
or artificial, is about 160 feet above the level
of the sea or channel. The communicating
tube is connected to the water-pipe by an ap-
paratus composed of a box, which is closed at
the top and bottom by sluices or valves, and
has in front a water-tight door. The com-
municating tube and the water pipe are fitted
to the bottom and top of the box respectively.
The internal section of the box is greater
than the bore of the communicating tube,
and it is intended to receive a case or re-
ceptacle containing the letters or dispatches
to be transmitted. This case is of smaller
diameter than the communicating tube, and
formed of iron wire rolled into a close coil,
and covered by a tight india-rubber casing.
Its mouth is closed with a water-tight cover.
In working the apparatus both the sluices of
the box being closed, the door is opened, and
the case containing the letters or dispatches is
introduced into it. The door is then closed,
and the two sluices are opened; the pressure
thus comes into action, and the case is caused
to travel through the tube to the other
station with considerable speed. The tube
at the receiving station must be opened, and
the case on reaching it may be allowed to
fall into a vessel formed with openings to
allow the water to run off. When it is re-
quired to dispatch another case the two
sluices are again closed, the case introduced
into the box, and so on as before.
MM. Berthelot and Vieille have recently
studied the question relating to

the velocity of propagation of explosive
phenomena.

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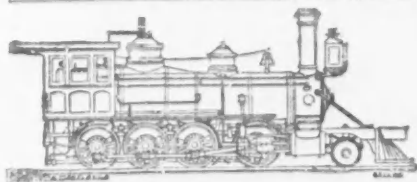
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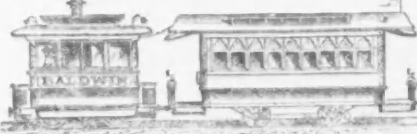
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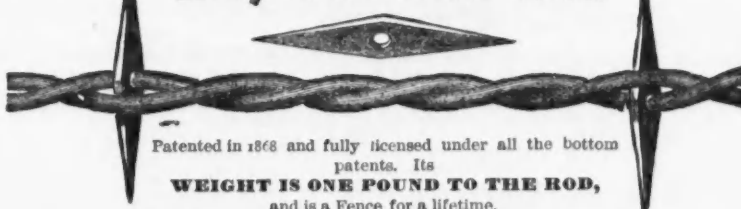
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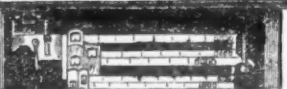


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 Price of 3-ton, platform 14 ft. 6 in., \$55.00. 4-ton, 24 ft. 6 in., \$65.00.
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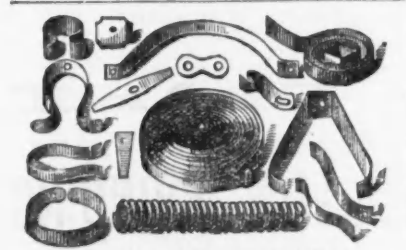
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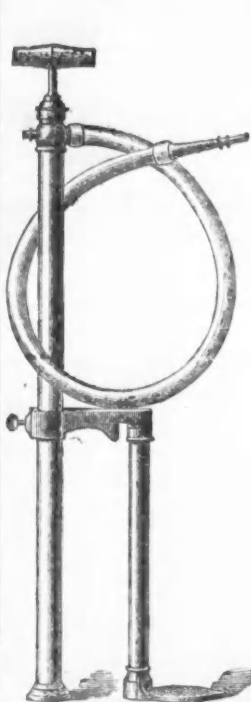
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 SIZED
 SPOTS
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 15 CENTS
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 of the American Improved Brass Garden Syringe.



The above cuts (Fig. 250) represent our **PATENT AQUAPULT**, so valuable a Hand Force Pump
 that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiar-
 ism in using our cuts and trade-mark name of article to decoy customers away from our manufacture
 and invention; and we caution the trade and customers against purchasing this article when not made
 by ourselves, as we intend to protect our rights under our patent.

**WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STEEL
 OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY
 STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR
 MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE
 SLIGHTEST FOUNDATION IN TRUTH.**

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Universal, Independent and Eccentric.

By sliding a stud on the back of chuck it is instantly
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Manufacturers of

SEAMLESS DRAWN BRASS & COPPER TUBES.

BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,

Tack Plates and Forgings of Every Description.

NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.

cases was 2841 meters, or about 9313 feet
 per second. A doubt whether it was really the
 rate of propagation of the detonation that
 was being measured, whether a vibratory
 motion of the metal might not have been the
 cause of rupture of the circuits, was set at rest
 when a similar strong caoutchouc tube was
 found to give like figures. With a capillary
 glass tube the velocity was somewhat less,
 viz., 2341 meters, (7678 feet). Next it was
 found that the velocity was much the same,
 whether one or other of the ends was open
 alone, or both were open, or neither. The
 velocity appeared to be uniform throughout
 the tube, and with pressure varied between
 one and three; the velocity seemed inde-
 pendent of pressure. The velocity is differ-
 ent in different gases; thus, in a mixture of
 carbonic oxide and oxygen, it was found to
 be 1089 meters (3571.92 feet). The dilution
 of the mixture of oxygen and hydrogen with
 air also redried the velocity, which, in a
 mixture containing 45 per cent. of the
 explosive gas, was 1439 meters, or about
 4720 feet.

Mr. Allen C. Wylie, of England, has re-
 cently devoted much time to the careful re-
 vision of the details of construction of

A MOVING CYLINDER STEAM HAMMER,

invented by the late Mr. Condie. The im-
 proved quality and moderate price of steel
 castings have enabled him to carry out the de-
 sire of Mr. Condie, by constructing all cylind-
 ers of cast steel. Each cylinder and cover is
 now made of mild, tough cast steel, to bear
 a tensile strain of thirty-four tons to the
 square inch, and the heaviest class of steam
 hammers are fitted with Wylie's patent com-
 pound steel cylinders. The piston rods are
 made of cast steel, according to Mr. Wylie's
 patent arrangement, by which one single
 hollow rod supplies steam to both sides of
 the piston. It is stated that about 500 of
 these hammers are in use by the English,
 French, Russian, Austrian, Belgian and
 Peruvian governments; the Lancashire Forge
 Company, Glasgow; Henry Bessemer & Co.,
 Sheffield; Barrow Steel Company, Barrow-
 in-Furness, and other important iron works,
 forges, &c., in Great Britain and on the Con-
 tinent.

Mr. L. W. Washburn, of Allston, Mass.,
 is the inventor of a mold and

PROCESS FOR CASTING STEEL TIRE CAR
 WHEELS,

which is at present attracting some atten-
 tion. The object of the invention is to cast
 wheels of two distinct metals in such a man-
 ner that the difficulties resulting from un-
 equal contraction are entirely obviated. The
 operation consists in first casting the center
 or body of the wheel from anthracite iron.
 While this part of the wheel is assuming a
 semi-molten state and slowly shrinking, a
 metallic ring, forming the outside periphery
 of the body portion, is removed, and another
 metallic ring of larger inside diameter, hav-
 ing a small fire cope attached, substituted
 therefor, after which crucible steel is cast
 through the small fire cope, striking the
 upper outside edge of the still white-hot cen-
 ter or body and partially remelting it. The
 cast-steel tire is thus enabled to unite thor-
 oughly with the soft iron center, completing
 a wheel that must necessarily shrink from
 the center or hub. Any liability of cracking
 from unequal contraction is thus prevented,
 and were it not for the difference in grain
 and color, it would be impossible to detect
 the line of union between the two metals.
 These wheels are reported to have already
 made a record of 100,000 miles before the
 first turning, between Boston and Chicago,
 under Wagner sleeping cars, and are guar-
 anteed to run 200,000 miles.

It is stated that large English firms and
 companies who use great quantities of files
 for engineering purposes, are beginning to
 recognize the advantages of Tilghmann's
 sand-blast process of

FILE SHARPENING.

The process has been described as a "liquid
 grindstone," this conveying, perhaps, the
 best idea of its effect. The "blast" is a jet
 of steam and fine sand, driven from a flat-
 tened tube against the back of the teeth of
 the file, and at an angle of about 16° with
 the face of the tool. The steam is conveyed
 from the boiler through a long pipe at a
 pressure of fifty pounds to the square inch.
 The jet of sand intercepts it at a few inches
 from the mouth of the tube, and the mixture
 is driven with extraordinary force and pre-
 cision against the back of the teeth, remov-
 ing all trace of the curly fragments left by
 the cutter, making the surface of the file
 thoroughly even, and sharpening each tooth
 more or less down to its base. Files sharp-
 ening on the sand-blast plan have been com-
 pared with ordinary files in their effect upon
 a piece of gun metal, and it has been shown
 that the former have removed twice the
 weight of metal removed by the latter in a
 given number of strokes.

Adjutant-Major Gaumet, of the 27th Regi-
 ment of France, has invented an instrument
 called

THE TELELOGNE,

for signalling from a distance. As experi-
 ence shows that familiar objects are the most
 easily distinguished, the signals consist of the
 letters of the alphabet and figures, which are
 silvered on a dead-black ground, and illu-
 minated at night by lamps and strong reflectors.
 A powerful telescope alone constitutes the
 receiving instrument. For signalling to a
 distance of two and a half miles, the whole
 apparatus weighs under five pounds; and
 with a more powerful telescope signals can
 be distinguished eight miles, and even further
 in a clear atmosphere.

Distillers' wash, which has hitherto been a
 source of annoyance, polluting streams, or
 rendering the soil putrescent, has been
 turned to account by MM. Gaillet and Huot,
 for

THE PRODUCTION OF ARTIFICIAL MANURE.

The wash, immediately after leaving the
 still, is agitated with lime water and then
 treated with perchloride of iron. The lime
 precipitates the sesquioxide of iron, the ferric
 precipitate taking up nearly all the organic
 matter. The wash thus becomes a perfectly
 clear, colorless and innocuous fluid. The
 deposit, or precipitate, is agglomerated into
 cakes and forms a manure very rich in
 nitrogen and phosphoric acid, which more
 than pays the expense of the process. Little
 space or labor is required, most of the opera-
 tions being performed automatically.

The safety valve problem has for some
 time past engaged the attention of many
 eminent engineers, the result having been
 that numerous experiments have been made
 and much information acquired concerning
 the action of ordinary safety valves and the
 causes of their comparative inefficiency.
 Special attention has also been called to the
 merits of an improved appliance known as

THE "TURNBULL EQUILIBRIUM SAFETY
 VALVE."

which may be said to be the outgrowth of
 the experience of disappointment and failure
 in the use of the ordinary valve. Mr. Gray
 (chief examiner to the Board of Trade,
 England), recently experimented upon two
 factory boilers, having a total fire-grate area
 of 26 square feet, and fitted with four ordi-
 nary safety valves, loaded by lever and
 weight, in the usual way, to 51 pounds pres-
 sure. Each valve was 3 inches in diameter,
 the total valve area therefore exceeding
 that required by the rule of the Board of
 Trade, being 28 square inches. All the
 valves were in good order, but at the close
 of the experiment the impression prevailed
 that these boilers had not enough valve area.
 Another experiment was made elsewhere
 upon a new double-flued boiler with eighteen
 Galloway tubes, and having 31 square feet
 of fire-grate. This boiler was fitted with two
 weighted lever safety valves, each 5 inches
 in diameter. The valve area, therefore, was
 more than two and a half times the Board
 of Trade rule, being 39.6 square inches for 31
 square feet of fire-grate. The valves began
 to lift at 46 pounds and to blow at 47 pounds.
 The pressure increased in the boiler to 55
 pounds before all the steam generated could
 escape, being an excess of 9 pounds. Upon
 this same boiler was fitted one of the Turn-
 bull safety valves, 1 1/2 inches in diameter.
 This valve began to lift at 48 pounds, and it
 was found that though the fires were urged
 to their utmost, the pressure in the boiler
 could not be got to exceed 50 1/4 pounds. The
 pressure oscillated between 50 1/4 and 49 1/4,
 showing that this small valve was more than
 a match for the boiler, and that, although it
 was only one twenty-third part the area of
 the two 5-inch valves, it was much more
 efficient in preventing increase of pressure.
 The theoretical area of the orifice of the
 valve is given as $\frac{3 \times 31}{55 + 15}$ square feet of fire-grate,

absolute pressure
 In Mr. Gray's experiment the total valve
 area was 28 square inches, the theoretical
 area being $\frac{3 \times 26}{60 + 15} = 1.04$ square inches;
 the area of the fire-grate was 26 square feet
 and the boiler pressure 60 pounds. The
 valve area employed was therefore about
 twenty-seven times the necessary area, and
 was still unable to relieve the boilers. In
 the second experiment the valve area em-
 ployed was 39.6 square inches. The theo-
 retical area of the orifice is $\frac{3 \times 31}{55 + 15} = 1.328$
 square inches, so that the area employed was
 thirty times the area of the orifice necessary
 to discharge all the steam generated. When
 the Turnbull safety valve was used, the area
 employed was 1.767 inch. The theoretical
 area of the orifice is $\frac{3 \times 31}{50 + 15} = 1.4307$
 inch, so that the area of the Turnbull safety
 valve was only one-sixth more than that
 actually necessary by calculation, but, as
 above-mentioned, the action of the valve
 showed that it was more than a match for
 the boiler. As the fire-grate in the first ex-
 periment was less than that of the second
 experiment, it will be apparent that this
 1 1/2-inch valve would likewise have relieved
 the boilers, which the four 3-inch valves
 failed to do. The valve is manufactured by
 Messrs. Alex. Turnbull & Co., of Glasgow,
 and is reported to be in use in some of the
 largest mechanical works in the country.

Coal in South Africa.—Two large com-
 panies have been formed in the Cape Colony
 for the purpose of developing the rich car-
 boniferous deposits recently discovered
 there. Examinations by competent geolo-
 gists have shown that the Stormberg range
 of mountains, on the eastern frontier of the
 colony, contains an almost unlimited quantity
 of coal of excellent quality, the careful de-
 velopment of which would make the colony
 independent of the supplies of coal now im-
 ported from England. For some years past
 the coal mines at Molteno and Paardekraal
 have been worked with most successful re-
 sults. The Molteno mine consists of a circular
 hill, at the summit of which a shaft has
 been sunk, while a heading has been driven
 on one side of the hill, opening rich coal
 seams, which appear to pass through the hill,
 and are estimated to contain at least 500,000
 tons of coal. The Paardekraal mine, ad-
 joining, covers an area of over 6000 acres,
 with a main seam of coal measuring 2 feet 6
 inches in thickness. A second hill, offering
 the same facilities for working as that al-
 ready described, exists on this estate. The
 Molteno coal is already largely used in the
 town of Molteno, both for household pur-
 poses and in some steam flour mills recently
 erected there. A third deposit is being
 opened at Cyfergat, on a closely adjoining
 farm, where another company has been
 formed to work the mine. The Cyfergat
 coal was lately used in the manufacture of a
 large casting made from locally produced
 iron, and was pronounced equal to the best
 South Wales imported coal. All these mines
 will be in close connection with the new line
 of railway now being built to Molteno from
 East London. As besides coal, ironstone
 yielding a large percentage of metal is found
 in the neighborhood of that town, a prosper-
 ous future seems to be in store for the district.

It is stated in a recent issue of the Bulletin
 of the American Iron and Steel Association,
 that Kemble Furnace No. 2, at Riddleburg,
 Bedford County, Pa., produced during the
 week ending January 28, 322 gross tons of
 pig iron. The first four days averaged 49
 tons; an accident necessitated slowing up the
 balance of the week. The furnace is 15 by
 60 feet, and the actual yield of the ore used
 during the week was 33 per cent. The
 lime used was 1 97-100 gross tons per ton
 of iron, and the coke used was 2 2-10 tons.
 William Lauder is the efficient general super-
 intendent.

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Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
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Paris, 1875.


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Picks, Mattocks, Grub Hoes, &c.,

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Lane Bros., Swift's and Gro-

cers' Coffee Mills and Measuring

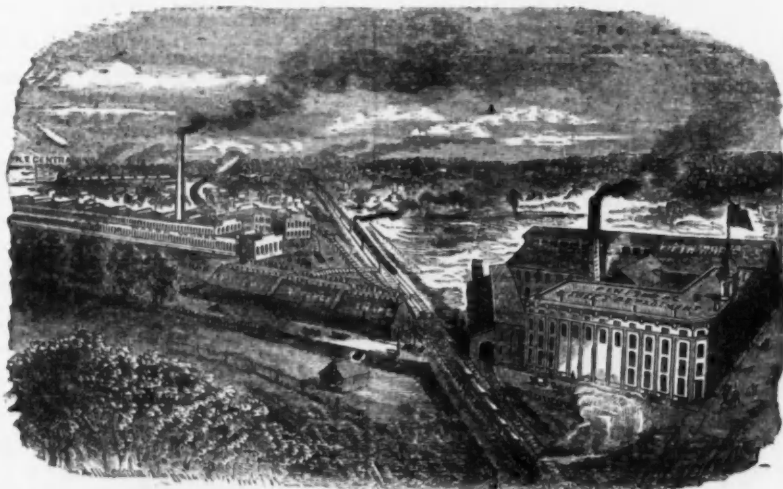
Faucets, &c.,

T. C. Richards Hardware Co.,

Bright Wire Goods, Picture Nails,

&c.

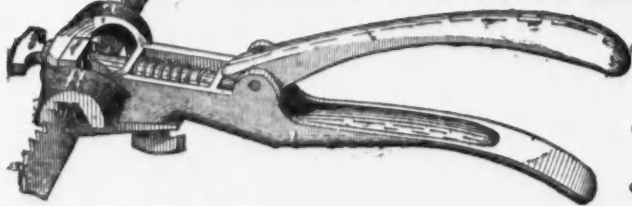
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White Mountain Freezer to all per-

sons: We have used them; they freeze

quicker than any other; they save time,

salt and ice; the triple motion makes

smooth cream without bunches; makes

more of it; galvanized iron outside; tin

inside; no zinc in contact with the

cream; easily adjusted; substantially

made; simple in construction; perfect

in results. Send for descriptive circular

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Feather Edge,
Finishing,
Flat

 Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulletting,
Half-Round,
Half-Round Wood,
Hand,

 Hand Equaling,
Handsaw Blunt,
Handsaw (Double-End),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,

 Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,

 Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,

 Square Blunt,
Square Equaling Files,
Stave Saw,
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Three-Square Blunt Files,
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Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,

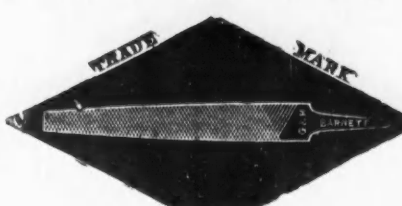
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Oval or French Shoe,
Racer, Plain and Tanged.

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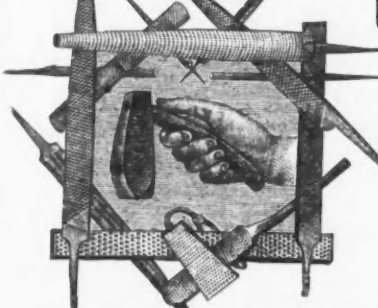
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Manufacturers of the Celebrated

J. B. SMITH'S FILES, RASPS, WOOD SAWS, &c.,

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New York Branch, 128 Chambers Street. W. M. H. BRAMHALL, Manager.

Prices the lowest. Goods the best. Send for sample order.

DODGE & BLAKE.

DODGE'S PATENT

FILE FORGING AND FILE GRINDING.

These machines have long been in use in this country and in Europe, and are unexcelled for per-

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Works at Woodside, NEWARK, N. J.

THRIFT FILE WORKS,

Manufacturers of all kinds of

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Established 1868.

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A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

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where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

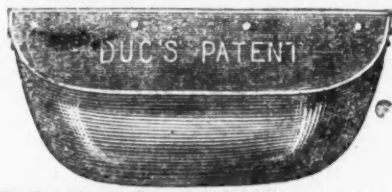
Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

DUO'S PREMIUM ELEVATOR BUCKET.



ALWAYS FIRST
COMPETITIVE



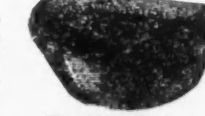
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The Storehouse Bucket, in sizes from 12 to 17 inches.

This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 300,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the **DUO BUCKET** has caused many manufacturers of the old style of Elevator Bucket to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

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The Mill Bucket, in sizes from 3 1/4 to 16 inches.

OLD COLONY RIVET CO., Kingston, Mass.

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Manufacturers of NORWAY IRON RIVETS of Superior quality.

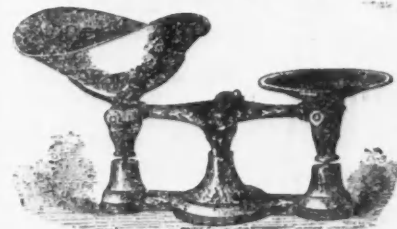
We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

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We carry the most complete stock in the city with our New York agents, *The American Tool Co.*, 116 Chambers St.

SCALES THE ANSONIA CORRUGATED STOVE PLATFORM.

Of all Descriptions,



For Grocers' & Family Use

Manufactured by

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Send for Illustrated Price List.

ESTERBROOK'S

STANDARD
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STEEL PENS

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Cut Showing Round Platform.

With Patented O. G. Border.
ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

Send for List and Discount.

Packed 12 in each case.

PURE ELECTRIC WIRE,

Manufactured by the

ANSONIA BRASS AND COPPER COMPANY,

For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Spilldorf's patented Liquid Insulation, covered with cotton or silk.

All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,

For Clocks, Indicators, Telephones, Call Bells, Bell Patches, Steamboat and Railroad Use. Burnished or Nickel Plated.

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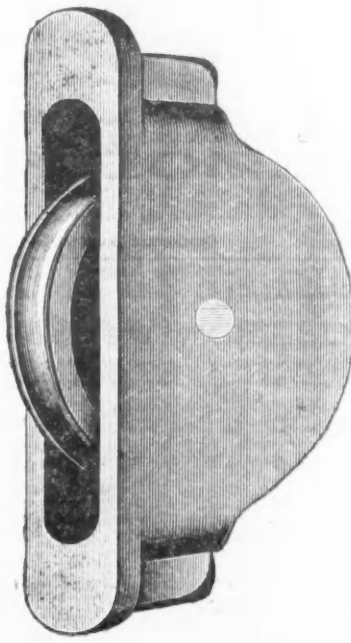
ESSEX HORSE NAILS.

Hot Forged, from Norway Iron, Warranted Best Quality, Pointed and Polished.

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The Screwless Window Pulley.

The Clark Manufacturing Co., Buffalo, N. Y., are introducing a hardware novelty in the shape of a window pulley requiring no screws or nails. Many inventions have hitherto been employed to fasten sash pulleys in place without screws or nails, but they have not been generally successful. The makers of the device shown in the accompanying illustration claim to have accomplished this perfectly, as the pulley is not only secure in place without screws or nails, but it is said to present a much more finished appearance when inserted than if held in place by any visible means of attachment. The mortise is made by hand, or with a machine to fit the pulley case proper, and the pulley inserted either end up. The end wing or flanges are driven into the solid wood attached to the end of the mortise. If



The Screwless Window Pulley.

applied to hard wood, a small kerf is made to receive the flanges. This pulley is of great importance to manufacturers of window frames, as it effects an important saving both in screws and labor. It is coming into quite general use and is well spoken of by consumers.

The Eureka Pipe Cutter.

We show in the accompanying illustration the Eureka pipe cutter, manufactured by Hancock & Maule, 243 and 245 South Third street, Philadelphia. It is a very simple tool, but the manufacturers claim for it several vital improvements in construction, tending to durability and convenience, which they believe will be appreciated by those having use for such an implement. The frame is of malleable iron, fitted with a hardened cast-steel jaw at the point where the greatest amount of friction occurs, and where pipe-



The Eureka Pipe Cutter.

cutting tools first wear out. This jaw can be renewed at any time at small cost, being detachable by the loosening of a single screw. The sliding block carrying the wheel is also of steel, hardened at the point where the end of the handle-rod bears on it, and it cannot be dropped out of its socket. The handle is formed by casting it fast to the wrought-iron rod, insuring its permanence, even with the roughest usage. The manufacturers have endeavored to make it thoroughly excellent and practical in every respect.

The Agricultural Implement Industry.—The census statistics relating to the manufacture of agricultural implements shows an enormous growth of this industry. In the United States there are 1942 establishments for the production of agricultural implements. Of these, 221 are in Illinois, 265 in New York, 220 in Pennsylvania, 153 in Ohio, 143 in Michigan. The total capital employed is \$62,315,668; paid in wages, \$15,499,114; worth of timber used, \$5,791,916; worth of iron and steel, \$18,424,952; worth of other materials, \$7,873,202; total, \$52,094,107. The largest number of persons employed during the year was 49,180. The total value of all products was \$68,573,086. In 1850 the total product was \$6,842,611. In 1860 it was \$17,487,960. In 1870, \$52,066,875. During the year there were made 325,057 cultivators; 131,003 harrows; 280,654 dozen of hoes; 212,147 dozen of shovels; 308,732 dozen of hand rakes; 1,361,443 plows; 211,738 dozen of hay forks; 1,244,264 scythes; 43,717 scythe snaths; mowers, 72,000; seed sowers, 20,289. In 1850, 7220 persons were employed; in 1860, 14,814; in 1870, 25,249, and in 1880, 49,180.

In a letter, recently printed in the New York Sun, it was alleged that the rapid destruction of the twelve Wagner cars after the collision at Spuyten Duyvil, was due to the fact that the floor were lined with shavings. It is presumed that the floor boards were broken and displaced by the crash, and that the shavings, thus scattered about the stoves, not only quickly ignited and prevented the rescue of the imprisoned passengers, but wholly enveloped the cars in uncontrollable flames. In connection with this subject the United States Mineral Wool Company write as follows to the *Railroad Gazette*: "We contend that the system of filling the floors of cars with mineral wool, which was inaugurated by the Pennsylvania Railroad Company in their standard car and is now conceded to be the best method of obtaining the various results desired, will obviate the worst conse-

quences brought to light by this recent fire. Three inches of mineral wool will be adequate where double the thickness of shavings would be considered necessary, and as every 100 square feet can be filled for \$6, we feel no hesitancy in calling the attention of all economical people to a comparison of it with the combustible article so generally used."

The Attachment of Patents for Debt.

Perhaps no recent case in the county courts of Pennsylvania has been regarded with more general interest by the bar than the suit of Bakewell & Kerr vs. Keller, the object of which was to determine whether, under the laws of Pennsylvania, a patent can be seized and sold for debt. The plaintiffs had obtained judgment against the defendant and a writ of *fi. fa.* was returned by the sheriff indorsed "no goods." It appeared, however, that Mr. Keller was the owner of a patent for "an improvement in sand and gravel separators," an appliance used in dredging. It seemed probable that the sale of this patent would yield a sum sufficient to partially or wholly satisfy the claims of Messrs. Bakewell & Kerr, and since neither the common law nor the statutes gave them the right to attach this by any of the ordinary processes, they filed a bill in equity some time since, asking the patent to be surrendered to a receiver to be appointed by the Court, by an assignment duly executed by the defendant in accordance with the provision of a statute of the United States; this being done, the patent should be sold and the proceeds appropriately divided. It was, moreover, proposed that during these proceedings the defendant should be prevented from encumbering, transferring, selling, assigning, or disposing of the letters patent in any manner. The court readily agreed to this last provision, and issued a preliminary injunction which was recently dissolved by decree. W. K. Jennings and Geo. H. Christy represented the plaintiffs, and W. C. Erskine and D. F. Patterson the defendant. At that time no opinion was filed, and considerable curiosity has been manifested since as to the grounds on which Judge Stowe based his ruling. The opinion was not forthcoming until a few days ago, a summary of which is given.

The bill alleges that plaintiffs are creditors of the defendant, and having obtained judgment, that a *fi. fa.* was issued, to which there was a return of *nulla bona*, and that the defendant is the owner of a patent right which cannot be seized for payment of debts. The only question that has given Judge Stowe any difficulty in this case related to the jurisdiction of the court under the facts set out in the bill. He has no doubt that in England and in the courts of the United States, where there is a general equity jurisdiction, such a bill would be sustained; in Pennsylvania, however, there is no equitable jurisdiction except where it is specifically granted, and the Constitution and the various acts of Assembly must therefore be considered to determine the authority of the court. The more refusal to apply to the payment of a debt or judgment that which the law has not made the subject of seizure certainly cannot be called in any proper sense a fraud, either actual or constructive. It may be morally wrong, and even absolutely dishonest, but certainly not legally or

equitably wrong under any proper definition of fraud. It seems, then, clear that no proper interpretation of the term "constructive fraud," however strained, can support the plaintiff's claim as set forth in his bill. So far as authority goes Judge Stowe has been unable to find any case where jurisdiction has been taken in such a case as this by any of the courts of the United States where there were not general chancery powers conferred by a special provision authorizing it. Creditors' bills against a debtor in his lifetime are defined to be a bill filed by creditors who seek to satisfy their debts out of some equitable estate of the defendant which is not liable to levy and sale under an execution at law, or out of some property which has been put beyond the reach of ordinary legal process. The ground in the case of a patent right is the latter. It cannot be taken and sold under an ordinary execution. It is, however, legal estate or property, and not equitable. The foundation of the jurisdiction in equity seems to be not fraud, but the general power of the court to deal with equitable property and rights. Judge Stowe further says: "It is clear plaintiff cannot sustain his bill under the act of 1836 giving Common Pleas courts jurisdiction in aid of execution; and being of opinion that the Legislature have never conferred upon the courts of this Commonwealth chancery powers in regard to such a case as is set out in plaintiff's bill, the injunction heretofore granted is dissolved."

An appeal to the Supreme Court will doubtless be taken by the plaintiff in order to settle the question beyond controversy. Judge Stowe's opinion is regarded as a very able presentation of the case, and the chances are that the Supreme Court would concur. If the decision of the lower court should be overturned, it is highly probable that a number of suits would soon be entered against debtors owning valuable patents that cannot be seized, and a decided improvement would result in the laws for the protection of the creditor. Several States have made provision for seizing patents for debts just as any other property, either by clothing the courts with general chancery powers or by special legislative enactment, and it is reported that a movement will be made to have a similar statute in Pennsylvania.

Marcus P. Morton, a lawyer of Troy, claims to have purchased of one Bixby his invention of the application of a valve to cylinder fire engines, and has instituted a claim for nearly \$500,000 against the city of Boston for infringement. He claims a royalty upon every engine owned by the city since 1862. Similar suits against other cities are contemplated.

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Are warranted to be equal in style, finish and quality, to any goods made in the world.
"COMPARE, THEN JUDGE."
We are the sole owners of the *Gardner Patent Guard and Best for Carving Forks*, and the manufacture of fine carvers is with us a specialty.

AMERICAN MADE RAZORS
CUSHION BELT
OUR NEW PATENT COMBINATION RAZOR STROP
No. 230
J. R. TORREY,
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In all Styles.
J. R. TORREY RAZOR CO.,
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To introduce we offer **HOLLOW GRIND RAZORS** at \$1.50, \$1.75, \$2; Ivory, \$2.50. Our **SWED-ISH GEM RAZORS**, \$1.75, \$2, \$2.50; Ivory, \$2. All our own make and warranted the best cutters in the world. As razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cts. a strop warranted to set a fine edge to any razor. If in morocco case, \$1.
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JOHN WILSON'S CELEBRATED BUTCHERS' KNIVES, BUTCHERS' STEELS, AND SHOE KNIVES.
TRADE MARK.
FOUR PEPPERCORNS AND A DIAMOND.
GRANTED A D 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD AND PROTECTED BY ACT OF PARLIAMENT.
REGISTERED ALSO AT WASHINGTON U.S.A. ACCORDING TO ACT OF CONGRESS
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It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such im- position.
JOHN WILSON also hereby gives Notice, that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark.
Every article of JOHN WILSON'S man- ufacture, bears the Trade Mark, in addition to the Name.

Seymour's Diamond Edge Solid Cast Steel SHEEP SHEARS.
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FLEXIBLE STEEL RULES and CENTER GAUGES Made of Best Quality Tempered Steel.
These Rules and Gauges are guaranteed of correct measurement, graduating $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 3, 4, 6, 8, 12, 18, 24, 36, 48, 60, 72, 96, 120, 144, 180, 216, 240, 288, 360, 432, 480, 576, 720, 864, 1008, 1152, 1296, 1440, 1728, 2160, 2880, 3600, 4320, 5760, 7200, 8640, 10080, 11520, 12960, 14400, 17280, 21600, 28800, 36000, 43200, 57600, 72000, 86400, 100800, 115200, 129600, 144000, 172800, 216000, 288000, 360000, 432000, 576000, 720000, 864000, 1008000, 1152000, 1296000, 1440000, 1728000, 2160000, 2880000, 3600000, 4320000, 5760000, 7200000, 8640000, 10080000, 11520000, 12960000, 14400000, 17280000, 21600000, 28800000, 36000000, 43200000, 57600000, 72000000, 86400000, 100800000, 115200000, 129600000, 144000000, 172800000, 216000000, 288000000, 360000000, 432000000, 576000000, 720000000, 864000000, 1008000000, 1152000000, 1296000000, 1440000000, 1728000000, 2160000000, 2880000000, 3600000000, 4320000000, 5760000000, 7200000000, 8640000000, 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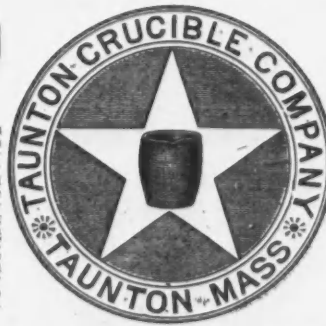
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(See Iron Age first issue of each month).

Explosion of a Cold and Dry Boiler.

A recent issue of the *Locomotive* says: The mere announcement of a boiler explosion has, perhaps, ceased to create any interest, from the frequency of their occurrence; but the explosion of a boiler which took place in the mill of Schumaker & Co., of Akron, Ohio, was of so unusual a character as to merit more than a passing notice. It was, in fact, a boiler explosion at a time when there was no steam pressure on, no water in, and no fire under it. The boiler, which is the return flue style, was built at Pittsburgh, and has a shell of about 72 inches diameter. The plates immediately over the furnace, either from excessive pressure of steam alone, or aided by the deposit of scale on their interior surface, which prevented the water from coming in contact with the iron, became considerably bulged outward, and it was while the workmen were engaged in cutting out these defective plates that the accident occurred. They had chipped an opening of several inches at the forward end of one of the sheets, when suddenly the after end tore apart with a tremendous noise; in fact, so loud was the report that the men engaged in the mill rushed to the door, exclaiming: "There goes another powder mill" (one having exploded only a few days before in that vicinity), and it was several minutes before it was discovered that the rupture of the boiler had caused it. One of the men, who was in the act of chipping, and had his hand held of the chisel which was wedged in the boiler, was so completely paralyzed on one side as to be unable to move, and he was conveyed home very ill. The rupture took place in one of the transverse seams of the boiler, tearing the solid iron between the rivets about one-sixteenth of an inch apart and over one foot in length. Philosophers and experts in engineering, who have been puzzling themselves and the public by their various theories of low water and no water, high pressure, superheated steam, electricity, galvanic action, unknown and combustible gases, &c., may here find a field for further speculation as to the cause of a boiler explosion in which there was neither steam, fire nor water.

The above account was lately forwarded to us by Chief Inspector A. C. Getchell, of the Cleveland, Ohio, office. At first we thought it somewhat resembled the story of the old lady's gun, "without lock, stock or barrel," which "went off" and killed some one who was fooling with it and "didn't know it was loaded," but the letter sent by Inspector Getchell explained the matter, and showed that it was produced by natural causes, the same as all boiler explosions are. It seems that the boiler had several sheets badly corrugated or buckled on the bottom, which brought a severe compressive strain on the flues, and consequently an equal tensile strain on the shell. The workmen were engaged in cutting out the damaged sheets, and when they had cut around about a foot, the great tensile strain on the shell, concentrated at the edges of the cut, tore the shell apart. The occurrence affords a good illustration of the fact that the strain caused by steam pressure is not always the greatest that a steam boiler is sometimes subjected to.

METALLURGICAL NOTES.

THE ELECTRICAL PROPERTIES OF INDIUM.

The royal indium mines at Freiberg, Germany, having come into the possession of a somewhat larger quantity of the metal than usual, placed some at the disposal of Mr. Th. Erhard, to enable him to make some experiments with a view of ascertaining the electrical properties of indium, in the course of which experiments great difficulty was caused by the softness of the metal. In order to ascertain the conductive resistance in the wire drawn from it, Mr. Erhard rolled it into a coil, finding, however, after unrolling and remeasuring at the termination of his researches, that the wire had extended its length by 5 mm. (1-5th inch). The formula quoted by Mr. Erhard: Resistance = .08903 (1 + .004744t), is based upon Dr. Werner Siemens' unit of resistance, and shows that indium offers a resistance about eleven times less than that of mercury, and increasing pretty regularly with a rise of temperature. The figures obtained from the observations at different temperatures and those derived from this formula agreed very well with one another. To find the thermo-electric force of indium, Mr. Erhard constructed batteries of pieces of indium on one side and iron, aluminum, tin, copper, gold, silver and zinc on the other side, soldered together in the usual fashion. Pretty fair currents were obtained with iron and aluminum; with copper the electro-motive force appeared to be weak, more so with gold and silver, and with zinc the currents were no longer measurable, though no doubt present. The temperatures applied by Mr. Erhard were 0° C. on one side and 36°, 77° and 98° C. on the other. From his results Mr. Erhard proposes to place indium between tin and zinc, the thermo-electric series being: aluminum, tin, indium, zinc, silver, gold, copper, iron, &c. For small differences of temperature, however, the series undergoes some modification. Mr. Erhard's further experiments with regard to the action of indium when in connection with liquid conductors were not satisfactory.

THE LAUTH THREE-HIGH MILL.

The Lauth three-high mill, for rolling sheet iron or steel and plates, appears to be gaining favor in Germany, Belgium and France. When first introduced some trouble was experienced by reason of the fact that the middle roll wore very rapidly, caused by the adhesion of cinder. This has been done away with by suitable stripping devices. Krupp has built a sheet mill for steel, having 24.6-inch top and bottom rolls, and 15 1/2-inch middle roll, the maximum thickness of plates entering the rolls being 0.5-inch. In turning out 0.06-inch sheets, the engine makes sixty revolutions; it makes fifty for 0.04-inch sheets, forty for 0.03-inch sheets, and thirty revolutions below that gauge. A Lauth three-high plate train at the same works has 35.6-inch top and bottom rolls, and a steel 17.80-inch middle roll, which is raised and lowered mechanically before every pass. The mill is run at the rate of forty-nine to sixty revolutions per minute.

SPENCE'S METAL.

The material known as Spence's metal is composed principally of iron pyrites and has the properties of melting at a low temperature and cooling very rapidly, thus enabling it to be cast in gelatine molds, by which process the most elaborate carving can be accurately reproduced. A perfectly sharp casting can be obtained by pouring this metal at a temperature of 250° F. into a gelatine mold which melts at 90°. Chilled at once, the metal forms a hard skin before the gelatine has time to melt. The heat of the metal will, after some time, melt the mold, too late, however, to injure the casting. When taken out of the mold, the metal has much the appearance of black Wedgwood, and is susceptible of the same amount of polish. Statues and bas-reliefs of any size can be cast with accuracy, and the finest work, such as the plate of a steel engraving or the carving of a Chinese card case, can be exactly reproduced. Its capability of withstanding exposure to the weather renders it very suitable for the decoration of architecture.

EXTRACTING METALS FROM ORES.

It has been proposed to obtain silver from sulphurous ores containing lead, by heating the ore with sulphuric acid in order to convert the latter metal into insoluble sulphate. According to the invention of Mr. Fuller, of London, England, the ore, after having been heated with sulphuric acid and washed to remove the soluble salts, is treated with nitric acid and again heated in order to convert the silver and other metals, such as nickel and cobalt, into nitrates. All acid fumes driven off during this operation are conducted into a chamber of sheet lead into which the sulphurous acid liberated in the operation of heating the ore with sulphuric acid is passed. The ore is finally lixiviated with water, thereby removing from it the nitrate of silver and other soluble nitrates together with nitric acid. This solution, after previous concentration, may be used over and over again until saturated with metal, and may then be introduced into the chamber above mentioned to aid in converting the sulphurous into sulphuric acid. The silver may be recovered from the residue, removed from this chamber, or may be removed from the solution of nitrates by well-known means. The residual nitrates having been mixed with sulphuric acid may be employed for dissolving out fresh quantities of silver.

IMPROVEMENT IN HEATING FURNACES.

In order to readily and effectually remove the slag formed in heating furnaces used in iron and steel manufacture, Mr. Thomas Adams, of England, proposes to incline the bed of the furnace downward, both from the fire-bridge end and the flue-bridge end, the lowest part of the bed being opposite the first working hole of the furnace. A tap-hole should be provided at the back of the furnace and opposite the first working hole. This tap-hole should open into a horizontal trough provided with a loose cover during the working of the furnace. In using the furnace the tap-hole is filled with oxide of iron, the filling being effected by the temporary removal of the loose cover of the trough and the introduction of the oxide into the tap-hole from the outside of the fur-

Consular Reports.

Presumably for the purpose of excluding American canned meats from competition with German farmers, the Minister of Finance at Berlin decides that henceforth duties on corned beef, &c., where labels are affixed to tin packing boxes, shall be collected "under the classification of knives, scissors, hair-pins, &c.," thus making the boxes dutiable rather than their contents. The Consul at Bremen remarks, in explanation, that "the cases, technically, are in connection and coherence with another material."

In relation to the adulteration of American cotton, Consul Shaw, at Manchester, does not deny that sand and water are added to increase the weight, but is satisfied that the fraudulent practices are of limited extent. Honest dealers are advised to insist on a system of packing and inspection for the correction of these abuses.

Consul Prindle, of Bahia, says there unquestionably exists in that city, the capital of the richest province in the Brazilian empire, a large field for the extension of American commerce, but feels "satisfied it will be a long time before that can be brought about unless we shall be represented by a first-class American house or houses to exhibit, defend and push our products and manufactures, the members of which, both principals and clerks—the latter should be American also—must have a good knowledge of the Portuguese language."

Consul Du Bois, of Aix-la-Chapelle, rebukes vigorously the American Emigration Societies for sending a certain class of documents to American Consuls for distribution throughout Europe, which assail certain portions of our national domain in the most unreasonable and inconsistent terms, and exaggerate the good qualities of another; in short to place in the hands of men who are comparatively ignorant of the true condition of things in America documents which could only tend to confuse and discourage those who are anxious to seek new homes in the great republic of the West.

The United States Consul at Carthage, Columbia, directs attention to an important decree issued by the Government, granting the free entry of materials and supplies of whatever nature that are to be used in the construction and development of public works and enterprises. American Consuls, both in Europe and South America, remark in substance that our manufacturers and merchants suffer seriously from the lack of direct lines of steamers to foreign ports, and from the want of a system of exchanges controlled by Americans and "hinged upon the condition of the American market." The new steamship line to Trieste is referred to as affording a favorable opportunity for our merchants to investigate the practicability of developing a trade with Austria and Hungary.

Now that bills are before Congress designed for the encouragement, by the general Government, of American steamship enterprise, it is possible that in the course of time our manufacturers may be able to compete with foreign rivals on more equal terms.

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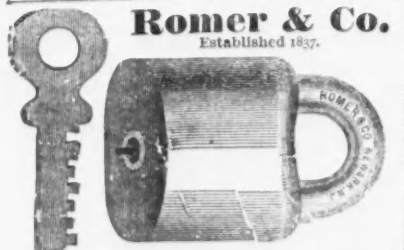
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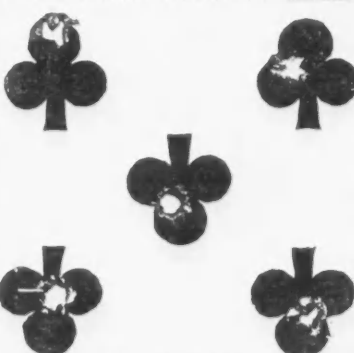


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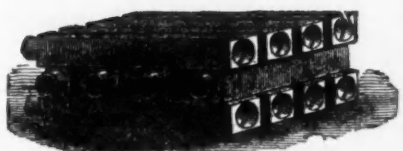
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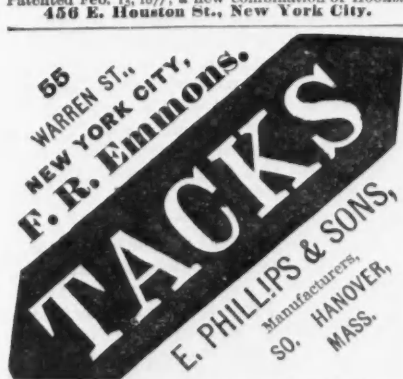
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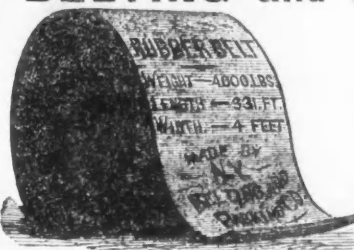
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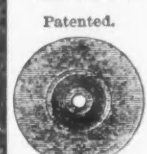
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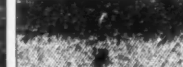
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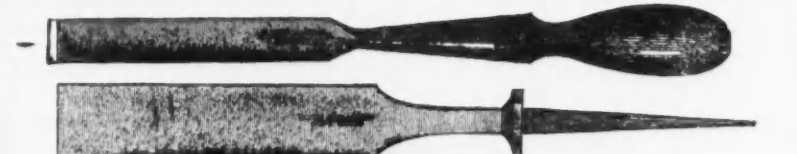


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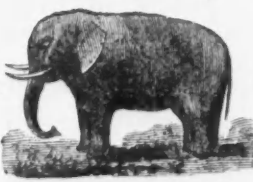
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nance. The cover is replaced immediately after the closing of the tap-hole. When the slag has filled or nearly filled the depression made for its reception, and it is desired to permit its escape, the workman introduces an iron rod into the front working hole, and passing its end across the furnace, forces the oxide out of the tap hole, thus allowing the molten slag to pass off through the trough above mentioned. By constructing and arranging the parts of the furnace in the manner described, the slag is collected at the hottest part of the furnace, and as the opening through which it escapes is opened only occasionally, and then only for a short time, the temperature of the furnace is not reduced by a continuous entrance of air at the slag hole, as in furnaces where the slag is allowed to escape in a continuous stream. On account of the high temperature to which the slag has been exposed, it forms an excellent fletting for puddling furnaces.

MANUFACTURE OF TIN AND TERNE PLATES.

An improved arrangement for the manufacture of tin and terne plates has been suggested by Messrs. Trubshaw & Leyshon, of Llanelly, England. They dispense with the vessel containing melted grease (called tinman's pan), the vessel containing melted tin or terne (tinman's pot), and with the soaking and dipping pot, commonly called the washman's pot. In place of the several vessels described, and the ordinary treatment therein of the plates to be coated, they employ a vessel of a special form, and carry on the process in a very simple manner. The pot or vessel is divided into two or more compartments, and they either employ tin or terne metal in all the compartments, or employ grease in one compartment and metal in the others. The compartment in which the plates to be coated are first treated is divided by a partition extending from the top to such a distance downward that its lower edge is always below the surface of the melted metal. This compartment contains tin or terne metal, and the surface of the metal on the outer side of the division is covered with a layer of rosin and tallow or other flux. On the surface of the metal on the inner side of the division referred to is a layer of tallow or palm oil, and a cradle is fixed to raise the plates out of the metal, being afterward drawn through brushes fixed at a convenient height above the bath. The other compartment contains either tin or terne metal or grease, and an arrangement of plain iron or steel rolls. After the plate to be coated has been cleaned by the ordinary pickling process it is immersed in the outer portion of the first compartment; it passes through the grease or flux on the surface of the melted metal, and is then introduced into the other portion of the compartment by being passed beneath the partition dividing it. The coated plate is drawn from the melted metal in the inner portion of first compartment, and is passed into the second compartment containing metal or grease. The plate is directed so as to pass between the rolls contained therein, and on its removal requires only to be treated by the ordinary cleaning process. It is claimed that by this invention the manufacture of tin and terne plates is simplified, labor economized, and the injury to the plates, which frequently results in the ordinary method of manufacture from the long exposure of the plates to the action of the melted metal, is avoided.

GOLD AMALGAMATING APPARATUS.

Mr. F. Campbell, of London, England, has invented an improved apparatus for the extraction of gold from sand or pulverized ores containing the precious metal. The invention consists of a washing tank supplied with water, revolving copper rods for the purpose of agitating the contents of the tank, and of a mercury trough, combined with one or more riffle-boxes fitted with a series of copper troughs arranged step fashion for the purpose of holding quicksilver and baize-covered tables. The apparatus is constructed in practice partly of copper and partly of wood and iron or other appropriate materials. The sand or powdered ore is introduced in any convenient manner to the washer tank where the copper-bladed stirrers are kept revolving. This tank is nearly filled with water, and is supplied with a bed or bottom of quicksilver. Here the sand is thoroughly beaten up and washed. The wet sand, after the washer is well charged, is then, by the action of the stirrers, beaten over the end of the washer to the riffle-box, which is connected therewith by a spout or spouts; in the riffle-box the sand passes by gravity over the quicksilver trough, arranged step fashion. From the riffle-box, by means of one or more spouts, the sand passes on to a series of precipitating trays or tables, each fitted with one or two quicksilver troughs. After passing these trays the residue of the sand passes on to one or a series of tables covered with baize. The quicksilver amalgam is removed from time to time and treated for the recovery of the gold, and the troughs replenished with quicksilver as often as necessary.

THE METALLURGY OF NICKEL.

Some interesting particulars have recently been given in regard to the metallurgy of nickel, the industrial applications of which metal have become very numerous since the introduction of the process by which it may be hammered and welded. This process consists in adding 1.2 per cent. of magnesium to the metal under treatment. Pure nickel has the advantages over its alloys of preserving its brilliancy in a damp atmosphere and of not being attacked by organic acids. It may readily be united with iron, its properties being, in fact, nearly the same as those of iron. Its elongation in forging and rolling is equal to that of Bessemer metal of medium hardness. A steel ingot may be welded to two ingots of nickel, one on each side, and, on passing the three together through a pair of rolls, sheets of any practical thickness may be obtained, perfectly coated with nickel. In the same way a nickel-coated steel wire may be obtained by wire-drawing. Nickel welds and melts at the same temperature as steel. In the process of nickelizing by electro-metallurgy, the double sulphate or chlorate of nickel and ammonia are generally used. These salts, however, undergo certain changes according to the forces of the electric current or the length of time during which the solution is subjected to its action—changes which act principally on the ammoniacal solutions, because the

ammonia is evolved at the poles in a state of gas. On the other hand, it has hitherto been impossible to use the simple acid salts of nickel, because they often give rise, under the influence of the electric current, to a gray or black deposit, which is not adhesive, instead of the true metallic deposit. This would appear to result from the formation of a sub-oxide, a sub-chlorate, or other sub-salts, which accompanies the metal. It has been found that by adding lactic acid to the saline solutions of nickel, this tendency toward an imperfect deposit is corrected. It is, therefore, no longer necessary to employ chemically pure products, as all impurities contained in the salts of commerce are completely neutralized by this method.

Steel for Shipbuilding.

Mr. James Park, Jr., of the firm of Park, Brother & Co., Pittsburgh, testified before the Naval Committee on the 17th inst., in regard to American steel for ships, that we have always been in advance of the foreign steel manufacturers in the production of low carbon cast steel suitable for ships' hulls; that when the English manufacturers began to send it over to this country to be used in the construction of locomotive boilers and fire-boxes it would not, for want of ductility, answer the purpose and was condemned. When the Pennsylvania Railroad Co. were anxious to introduce steel into the construction of their locomotive boilers and fire-boxes, that company, through its master mechanic at the Altoona shops, applied to Mr. Calvin Wells, of Messrs. Hussey, Wells & Co., steel manufacturers at Pittsburgh, to know if a low-carbon steel could be made of a tensile strength equal to 70,000 pounds and with an elongation of 30 per cent. Mr. Wells, having much experience in the manufacture of cast steel, commenced making experiments, and after much anxiety and trouble succeeded in producing the desired article. At this time there were no Siemens-Martin or open-hearth furnaces in this country. Therefore, Mr. Wells was compelled to adopt the crucible melting to secure his results. It was not long after the success of Mr. Wells when other large steel establishments in Pittsburgh, profiting by his experience, commenced to successfully manufacture the same article. The English steel manufacturers on examining specimens of this low carbon homogeneous cast steel which were "bent cold" and sent across the Atlantic, commenced to produce an article as near as possible up to the standard of that made at Pittsburgh, yet they have not up to this time equalled in quality that made in this country. Our advantage in producing so superior an article is, to a great degree, owing to our charcoal irons, so admirably suited for melting.

Mr. Park informed the committee that there is now about \$25,000,000 invested in the "crucible" and "open-hearth" steel manufacture in this country. He also said that the Government need not be uneasy in regard to procuring all the low carbon cast steel required for any number of vessels that it may determine to build for its navy. He recommended a tensile strength of 60,000 pounds to the square inch and elongation of 30 per cent., which, he said, would be the safest material from which to build the hulls of naval vessels. On being asked what would be the probable result in case a ship, the hull of which was made of such steel as he recommended, would come in collision with another vessel or run against rocks as compared with the result with one made from the ship iron now in general use, his answer was that while indentations or bulges as large as several large-sized hog-heads might be made in the steel hull without producing any break in the steel plates, he believed an iron ship under the same circumstances would sink by reason of the iron plates, for want of ductility, breaking into pieces. Mr. Park informed the committee that our home capacity for the production of low carbon cast steel suitable for navy vessel hulls considerably exceeds that of England, Scotland and Wales.

Large Virginia Enterprises.—The Alexandria Gazette reports a meeting in that city last week of the incorporators of and others interested in the Virginia Coal and Iron Co., the Holston Steel and Iron Co., and the Southern, Atlantic and Ohio Railroad Co. Among those present were Gen. John D. Imboden, of Southwestern Virginia, R. A. Ayres, of Estillville, Va., H. C. Wood, of Scott County, president pro tem. of the Virginia Senate, A. W. Leisenring, E. K. Hyndman, R. C. Dale, W. H. Coldron, J. S. Wentz, G. B. Leisenring and Daniel Bertsch, of Pennsylvania. The object of the Virginia Coal and Iron Company, says the Gazette, is to develop 100,000 acres of coal, timber and ore lands in Wise, Scott and Lee counties, and the construction of the Southern, Atlantic and Ohio Railroad, which starts from the line of the Norfolk and Western road, and runs in a northwest direction to Big Stone Gap, from whence it is to be extended to the Kentucky line to meet certain railroad lines from Ohio. The Holston Iron and Steel Company has for its objects the construction of iron and steel furnaces in Southwestern Virginia. The Virginia Coal and Iron Company has a capital of \$1,500,000. The Holston Iron and Steel Company has a capital of \$500,000.

D. M. Steward, Cincinnati, is manufacturing a new insulator, which, it is claimed, will serve the excellent purpose of protecting buildings from all danger attending the attachment of electric wires to their roofs. These insulators, which are made in all the shapes likely to be found useful, are made from a composition of clay treated by a new process. The material resembles the so-called lava used for gas pipes and other purposes. They have been carefully tried, and are said to have proved excellent non-conductors.

The Dennison Steam Fire Engine Mfg. Co., of Reading, have just completed what is claimed to be the smallest steam fire engine in the world. It weighs 2700 pounds when fully equipped for duty, and at a recent trial threw a solid stream 218 feet through a 1 1/2-inch nozzle.

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AND
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The New York Legislature will soon be called upon to consider a bill introduced by request of the Brooklyn Police Commissioners, requiring that all boilers in use in the city of Brooklyn shall be tested by hydrostatic pressure. We confidently hope this bill will not pass. There are other and much better ways of inspecting boilers than by hydrostatic pressure. Testing by the latter method is known to be attended with serious danger to boilers, and unless very skillfully and carefully employed it will be a great wrong to steam users. There are said to be about 2000 steam boilers within the limits of

Brooklyn, and under the present law boilers insured by private corporations are exempt from official inspection by the Brooklyn authorities. If they deem it well to extend their authority over boilers not now coming under official notice, there is, perhaps, no objection to their doing so; but if, as is probable, the proposed hydrostatic test will consist in determining experimentally how many pounds of cold water pressure a boiler will stand without rupture, vastly more harm than good is likely to be the result of official interference.

The Decline in Wheat.

The extraordinary advance and recent decline in wheat and other breadstuffs, as well as provisions, is a subject of such general interest that we may be permitted to place before our readers a few statistical tables relating to the amount of wheat available for export to the close of the present fiscal year. For the export figures we have calculated the barrel of flour to represent 4½ bushels of wheat:

Supplies.	Wheat available for export, Free Press.	Wheat available for export, New York Produce Exchange.
Visible supply July 1, 1879	12,200,000	12,200,000
Wheat crop, 1879	448,000,000	459,000,000
Wheat crop, 1880	498,000,000	498,000,000
Wheat crop, 1881	395,000,000	393,000,000
Canadian surplus, 3 years.	15,000,000	15,000,000
Total	1,358,000,000	1,327,000,000

EXPORTS.

12 mo. ended June 30, 1880	181,000,000	180,300,000
12 mo. ended June 30, 1881	193,000,000	186,300,000
Total	374,000,000	366,600,000

CONSUMPTION FOR FOOD, SEED AND MANUFACTURES.

12 mo. ended June 30, 1880	258,000,000	267,750,000
12 mo. ended June 30, 1881	279,000,000	279,650,000
12 mo. ended June 30, 1882	290,000,000	276,750,000

Total Exports, &c. . . 1,192,000,000 1,177,750,000

Residue available for export for the 12 months ending June 30, 1882, . . . 164,000,000 175,000,000

The actual export of wheat and flour from the United States during the first half of the current fiscal year has been 73,117,702 bushels. Assuming the amount available for export to be 170,000,000 bushels for the twelve months, there would be left for the latter half of the fiscal year, from January 1 to July 1, 1882, about 97,000,000 bushels. Supposing this to be correct, and the above careful estimates from the best authorities fortify this assumption, it was certainly time that the price should recede to the export point, and thus prevent a ruinous decline in the event of an abundant or even half-way abundant crop, in America and Europe. The mania for speculative dealings in wheat began last fall, and has prevailed to an extent never before known in the business. Even people of small means have, in many instances, invested a few hundred dollars as a margin on future deliveries. In this manner the demand seemed to be enormous, and wheat steadily rose until it reached a point far beyond the rates which exporters could afford to pay for it. England, instead of paying our exorbitant prices, looked around and got wheat from almost every quarter of the globe, frequently buying wheat equal in quality to any we can produce, and at figures considerably below what we were asking a few weeks ago. Simultaneously with the conviction that our best customer had slipped through our fingers, came the news that farmers in the Northwest were plowing, and in some parts of the country seeding, for the next crop, the winter having been remarkably open. Furthermore, the warm weather has not only hastened planting, but heated the grain in store, causing a light home consumption. By reason of all this, the absurdity of quoting winter wheat in New York at \$1.62 per bushel, and spring wheat in Chicago at \$1.49, became apparent, and timid holders began to "stand under." With the first signs of the fall, there was a scramble to close out contracts, and speculators could not put up margins fast enough. Last year the highest price touched for spring wheat in Chicago was \$1.13 per bushel, as against \$1.49 this year. Now there is a momentary lack of freight room, as the steamers go out crowded, and freight rates have advanced. The rage in wheat speculation has been such of late that storekeepers, lawyers, doctors, and even women, have taken a hand in it. The business done in wheat in a single day at Chicago last week, is said to have reached 30,000,000 bushels. In New York during the week 25,000,000 bushels changed hands, indicating larger dealings on our Produce Exchange than for some time past, about 10 per cent. being for actual use or export, the rest constituting the speculative business of the institution, which is getting to be worse than the Stock Exchange as a vast gambling establishment—worse, because it affects the price of daily food for the masses instead of the price of securities. The virulent character of speculation on the Produce Exchange began about two years ago, and since then it has grown worse every day. Scores of men have been attracted from Wall street who scarcely know Indian corn from wheat, and who simply gamble. The exports from the chief seaboard ports, which for the week ending February 12, 1881, were 1,049,417 bushels, were this year during the corresponding week only 389,676 bushels. While this is the case, we are advised from London that the amounts allowed for England from countries on the Pacific are simply enormous.

The injury which this insane speculation in articles of food inflicts upon the people at large, especially the needy classes, is incalculable. Yet there is no remedy for it, and it would be useless to moralize upon a subject which has been a source of trouble as far back as the time of the Pharaohs, and which no legal restrictions have been able to control at any time or in any country since. Between the speculative breakdown in stocks in Europe and the great decline in articles of prime necessity on this side, we have seen thus far in the year 1882 considerable liveliness. Certainly the year begins to deal out some severe lessons to the speculative fraternity of all stripes on both sides of the Atlantic, and has commenced to restore to their senses a great many people who had evidently been bereft of them for many months past.

Trade of the Dominion.

The statistics of trade and navigation of the Dominion of Canada for the year ending June 30, 1881, have been presented to the Provincial Parliament and occupy much space in the local newspapers, whose chief ambition appears to be to make a point either in favor of or opposition to the existing administration. On the whole, they are regarded as favorable to the country. The Commissioner of Customs points out as a feature worthy of special notice, the increase in the export trade. The highest figure reached in this department of commerce since 1868, or since the confederation, he says, was in 1873, when the total exports were valued at \$59,789,922; but in the last year, 1881, the amount of the same, as shown in these returns, is \$98,290,823, being an increase over 1873 of \$38,500,901, and over 1880 of \$10,379,365. The increase is wholly in the trade with Great Britain, and is principally composed of Canadian produce and manufactures. The opposition editors direct attention to the fact that the increase in the export trade last year was "made up altogether of lumber and farm produce," and deduce therefrom an argument that there is little prospect of Canada ever becoming a large exporter of manufactured goods under the existing fiscal policy. The classification of exported merchandise for the last two years is as follows:

1881.	1880.
The mines . . . \$2,016,254	\$2,081,613
The fisheries . . . 6,808,884	6,653,347
The forest . . . 25,709,818	17,660,093
Animals . . . 22,665,010	18,504,009
Agriculture . . . 34,894,127	32,387,128
Manufactures . . . 4,043,123	4,484,211
Miscellaneous . . . 763,050	759,196
Total . . . \$94,296,466	\$83,336,797

To the total here given for the last year must be added the exports of coin and bullion, bringing the total up to \$98,290,823, as we have stated above. The value of exports by countries for the years 1879-80 and 1880-1 was:

1880.	1881.
Great Britain . . . \$45,846,076	\$53,751,370
United States . . . 33,240,000	38,856,229
France . . . 812,829	652,721
Germany . . . 82,237	84,998
Spain . . . 50,727	46,753
Portugal . . . 155,884	108,594
Italy . . . 163,787	145,097
Holland . . . 208,502	215,754
Belgium . . . 688,811	298,433
Austria . . . 1,319,000	1,323,409
British West Indies . . . 1,000,051	1,757,513
Spanish West Indies . . . 1,319,588	1,177,012
French West Indies . . . 27,673	111,178
Other West India Islands . . . 94,489	80,769
South America . . . 789,149	732,111
China and Japan . . . 37,546	12,761
Australia . . . 139,001	146,363
South Africa . . . 82,178	81,044
Other Countries . . . 534,651	499,437
Total . . . \$87,011,458	\$98,290,823

The value of exports from the different provinces in 1881, compared with 1879 and 1880, was as follows:

1879.	1880.	1881.
Ontario . . . \$23,854,540	\$28,093,980	\$30,014,478
Quebec . . . 20,740,512	41,447,209	48,955,537
North Scotia . . . 7,354,324	7,541,684	8,445,754
New Brunswick . . . 5,371,471	5,863,055	6,405,374
Manitoba . . . 512,899	562,714	626,116
British Columbia . . . 2,755,972	2,043,570	2,255,723
Alberta . . . 1,811,329	1,736,333	1,774,466
N. W. Terr. . . 60,139	40,813	24,431

As regards imports, the total for 1881 is \$105,330,840, or \$7,040,017 in excess of the exports, indicating an apparent balance of trade against Canada; but so far from being regarded as a deplorable circumstance, the difference, says a Montreal contemporary, represents "a profitable year's business done by our exporters." The imports of goods for consumption, the produce of the United States, into Ontario and Quebec in 1881 was \$36,704,112, against \$29,346,948 in the previous year. "We find, however, by the returns," says the Montreal Herald, "that the increase in the duty on the imports from Great Britain has been greater than upon the United States, showing that the present tariffs, instead of discriminating in favor of the British importer, has quite an 'opposite effect.'"

Montreal is very complacent over the fact that nearly one-half of the entire customs revenues of the Dominion was paid by that province. In comparing the United States and Canadian returns of trade between the two countries, a curious discrepancy arises, amounting to no less than \$10,000,000, in the statement of imports for the last year. According to the Canadian statistics, her imports from the United States for the last fiscal year were \$42,885,418, while the corresponding figures taken from United States accounts were \$32,971,935. Perhaps there is too much smuggling.

The scandal connected with the engines of the Pittsburgh Water Works seems likely to continue a topic of local interest for some time to come. Prof. Geo. Hayes, summoned as an expert, has given testimony in regard to analyses of pieces of iron taken from the engine. One sample

tested showed 3.007 parts of silicon, 7.081 of phosphorus and 0.175 per cent. of sulphur. Another sample showed 3.08 of silicon, 6.38 of phosphorus. The third sample showed 3.2 of silicon, 7.719 of phosphorus. The fourth sample, silicon, 3.922; phosphorus, 6.86. Fifth sample, silicon, 2.65; phosphorus, 5.29. Sixth sample, silicon, 2.93; phosphorus, 6.38. There was an average of 0.75 per cent. of sulphur in each sample tested. As the result of his tests, he declares himself unable to regard the iron as of good quality. He attributes the crack in the valve chamber to unequal shrinkage in casting. It is possible that Mr. Hartup did not consider it worth while to use any better iron in such an engine as that designed by Mr. Lowrey. Considering it from an engineer's standpoint, it is a sort of nightmare from beginning to end. We have no doubt that all concerned will be heartily glad when the matter is finally settled.

The McKinley Bill and the Revenue.

In our issue of last week we referred briefly to a letter which Judge Folger, Secretary of the Treasury, had sent to Mr. Randall, of the House of Representatives. The letter was called forth by a request from Mr. Randall for a statement regarding the McKinley bill, and is in many respects a most remarkable document—its remarkableness, however, growing out of collateral considerations and not directly from what Judge Folger says. We give the matter in full. Judge Folger writes to Mr. Randall:

As requested, I inclose a tabular statement prepared by the Appraiser at New York, showing the articles imported at that port, the duties on which would be affected by this bill, the present rates of duty collected thereon, and what the duties would be under said bill. As to the result of the bill—should it become a law—on the revenues of the Government, I can only say that the effect of enhancing the duties say on steel blooms from \$12.63 a ton—the present duty—to \$50.40—the proposed duty—would be, undoubtedly, to diminish the volume of importations to such an extent as largely to decrease the revenues from that source. The same would be true of other articles which would be affected by the bill. As bearing on the subject, I inclose copy of a letter from Mr. Schlesinger of Naylor & Co., of New York, relative to estimated importations of steel wire rods and steel blooms and under the ad valorem and specific rates.

Mr. Schlesinger's letter is dated Nov. 28, 1881, and reads as follows:

I have the honor to inclose to you herewith the statement you desired, made up as accurately as possible according to the best data I could get. From this you will observe that when I stated to you that the decision on blooms and wire rods would yield a revenue, including sales made for 1881, of \$2,000,000, I was understating it, because the amount of \$5,000,000 includes only sales made by ourselves already for 1882, on which the revenue will be \$669,000, and I estimate that the total revenue in 1882 from these articles will be larger than ever before, and will swell the grand total to about \$8,000,000. In contrast to these figures I would mention the significant fact that the entire revenue derived from our total importations of these articles to New York in the year 1879 was \$1,300, their importation being virtually prohibited. A tariff of \$3 per ton on steel rails, the cost of which is about \$26 per ton, is already about 100 per cent. and next door to prohibition. A tariff of 2½ cents on steel blooms and wire rods would amount to about 200 per cent. and would be absolutely prohibitory. The wisdom of these decisions referred to cannot, therefore, be questioned by any impartial mind.

One of the schedules transmitted by Secretary Folger shows that the estimated total duty paid at the four ports of Baltimore, Boston, New York and Philadelphia upon steel rods and steel blooms, respectively, for the years 1880 and 1881 was as follows:

1880.	1881.
Steel Rods . . . \$421,000	\$1,410,000
Steel Blooms . . . 800,000	1,715,000

Total . . . 1,221,000 3,125,000
Aggregate . . . 4,223,000 4,348,000
Duty on sales made by Naylor & Co., for delivery in 1882, \$669,000.

The first thing that will strike one acquainted with the course of legislation and opinion at Washington, is the extreme solicitude of Mr. Randall as to the effect of this bill on the revenue. As he is the head and front of an attempt to reduce the revenues of the Government some \$60,000,000 to \$80,000,000 a year, it is not evident why he should become solicitous for the revenue all at once when it is proposed to put the duties on certain articles to the rate Congress meant they should pay. He can be a party to a reduction of the revenue on whisky, which may be all very proper, of nearly 50 per cent., but he is solicitous to learn what would be the effect if steel blooms were made to pay 2½ cents a pound. The revenue from beer may properly be reduced, but how about making cotton ties pay duty as hoop iron?

There is another view of this that we suppose will have little or no weight with Mr. Randall. This country has just declared in a most pronounced way against a tariff for revenue only, and yet the whole consideration of these letters is what will be the effect of the McKinley bill on the revenue. No consideration of what has been the effect of erroneous decisions on American industry is necessary. The whole argument of the letters is on the basis of revenue, and Mr. Schlesinger, who may or may not be an American citizen, coolly tells an American Secretary of the Treasury, and that Secretary transmits it to a prominent Congressman, that because the tariff which Congress, in its wisdom, chose to put on steel wire, rods and blooms would be prohibitory, the wisdom of the Treasury Department in rendering a decision allowing them to come in at a lower rate cannot be questioned!

If this is not "monumental impudence," we have never seen an example. There is no doubt that Congress in 1864 intended that wire rods should pay 2½ cents a pound. It

is a matter of record, under oath, that the words "steel in coils" were put into the act to cover "wire rods." The Appraiser of New York, in the tabular statement appended, speaks of them as "steel wire rods in coils." They are never imported except in coils, and Mr. Schlesinger states because the duty of 2½ cents would be prohibitory, therefore the wisdom of a lower rate cannot be questioned by any impartial mind. We wonder how Congress will like this. Mr. Schlesinger also states that the duties on importations of steel blooms in 1879 was only \$1300, their importation being virtually prohibited. He can have intended to convey but one idea, and that was that the duty on these articles was greater in 1879 than afterward. The duty on steel blooms has been 45 per cent. since 1867. We respectfully suggest that when the Secretary of the Treasury desires opinions about the operation of our laws, he ask them from those whose interests are American and not foreign. The former may be as "impartial" as one whose interests are all in low tariffs, and as proper judges of what is wise for a United States Congress to do as the one whose letter is sent to Congress, and who, we believe, is a representative of the German Empire. In other words, we believe that the opinions of representatives of American industry are better guides for Congressional action than those of a German Consul or any other resident or non-resident foreigner.

Customs Disputes.

We see it announced that the Finance Committee of the Senate has invited the representatives of several chambers of commerce at ports of importation to appear before it and give their views as to Senator Sherman's bill "to facilitate the decision of 'controversied questions in customs revenue cases.'" This is a bill to which we have already referred. It takes all such cases out of the hands of the Secretary of the Treasury and the Circuit Courts, and gives the Court of Claims jurisdiction over them. Under the present law, when an importer is dissatisfied with the classification or appraisement of an invoice, and with the amount of duty assessed, he must, within ninety days, appeal to the Secretary. The Secretary has no time to sit as a judge in such cases, and practically they are determined by an assistant or by the head of the Customs Division of the department. If the importer is not content with the decision he may bring an action, within ninety days, against the Collector in a Circuit Court, or if the department delays action beyond ninety days he may sue without waiting for its decision. As the courts are crowded with business, and are two or three years behind with their dockets, a vexatious and unjust delay occurs. Besides, there is always the liability to inconsistency in the decisions of many courts and of different Secretaries. Mr. Sherman's bill aims to secure expeditious and harmonious action by a single tribunal sitting in Washington. It has the endorsement of the present Secretary and four ex-Secretaries and of the Judges of the Supreme Court, and with such strong backing will have a good chance of becoming a law, unless the objections urged by some of the merchants of this city outweigh its evident advantages. The chief of these objections is that it removes the trial of cases from the local courts and puts plaintiffs to the expense of going to Washington with their witnesses.

There is one serious objection that we see to this bill. At present, by courtesy of the Secretary of the Treasury, the manufacturer of this country whose business may be affected by importations is allowed to appear and argue his side of the case. If this bill passes in its present form even this courtesy will be taken from him, and the American manufacturer and the American workman, for whose protection these customs laws were passed, will have no standing anywhere and be powerless to say a word in defense of his rights. It might be well for the Finance Committee to invite representatives of the workmen and manufacturers to appear and give their views.

Our readers will remember the action of the Amalgamated Iron Association at its session last fall in regard to negro ironworkers. Up to that time they had persistently ignored the claims of the colored man to recognition, and had refused to consider him as proper material for a good trade unionist. But he had grown to be a disturbing element, and so he was accepted at the convention as a proper candidate for membership in the Amalgamated. This action has met its reward. The colored puddlers at work at Park Bros. & Co.'s Black Diamond Steel Works, Pittsburgh, joined the association and struck some two weeks since. The *Labor Tribune*, in a recent issue, pleads for the new member in a way that indicates that there is not perfect unanimity as to his admission. It says: "Increase each lodge, whether by white or dusky-hued members. When there is a 'strong fight against the association, such as is now evidently projected, prejudice should take a back seat, and every effort be made to make strong the labor associations, whether by black or by white members. If there shall come a division of the labor organizations it will be because employers will use the prejudice that some men have 'as to color. See, men, that you lose no advantages now attained by any giving 'in to such utter foolishness.'" The "dusky-hued" members may yet be the bone of con-

tention over which the impending struggle within the association, a struggle that it is no secret has been in progress, may come to a definite issue.

The manufactured iron trade in England, although in a state of encouraging activity, is at present threatened by a general strike of the ironworkers of the North of England. When it is considered that nearly half of the make of pig iron in Cleveland is consumed in the mills and forges on the banks of the Tees, Wear and Tyne, it will be easily understood that the attitude of the men at present is a very serious matter. For some years the wages questions in the North of England manufactured iron trade have been adjusted through the medium of the Board of Arbitration, and at present the men are paid under a sliding scale. Latterly, however, the market prices of finished iron have very much improved, and the men have grown dissatisfied, being under the impression that the scale would give them much better wages. The fact, however, is that the iron manufacturers sell so far ahead that the selling prices taken out of their books by a London accountant do not bring the average to anything like the quotations now ruling for contracts entered into to-day. The men do not sufficiently grasp this position of affairs, and they are agitating for an advance of 7½ per cent., regardless of the sliding scale or Board of Arbitration, and at Stockton, Hartlepool and other places they have ceased work. There was a meeting recently of the Board of Arbitration, consisting of employers and operatives, and it was decided that the men should continue to work, and that the question should be referred to an arbitrator. The following day, however, several works were stopped, the men refusing to go on unless they got the advance. At a later meeting of the Board of Arbitration it was decided that as the men had broken the rules of the board by ceasing work, the latter should not further inquire into the matter till the men resumed work.

Shipbuilding in the United States is not a lost art, as might be inferred from the newspapers. In fact, it is with us a nascent industry, the substitution of iron and steel being in the first stages of development. Looking forward, our artisans have a prodigious advantage in being able to profit from the experience of those in Europe who have acted as pioneers in this department of enterprise. Already we have a good start. A firm on the Delaware River is now engaged on the thirtieth iron and steel steamer built to ply on the Amazon; also seven for the Orinoco, besides something like three-score for other parts of South America and for Mexico. American steamers on the Magdalena River have long done good service. Other firms have an equally good record, being able to point with pride to ocean steamers nowhere surpassed in point of construction, beauty or performance, and our iron river and harbor boats, like the City of Albany, are unexcelled. Experts who are called to act in the Naval Advisory Board, do not hesitate to affirm that our private shipbuilders are capable of providing themselves within a very brief period with a plant comprising appliances equal, if not superior, to anything found elsewhere in the world. We have no reason to doubt the assertion. Within a period of three years they brought into existence a fleet of 105 monitors, ironclads and unarmored vessels, and that while they were mere amateurs in the art. Congress has but to keep "hands off," and our iron shipyards will eventually rival those of the Tyne or Mersey.

The Department of Agriculture has completed its estimates of the cereal crops of 1881, showing a yield somewhat below the average for several years past. The aggregate value of cereals grown in 1881 is, however, greater than the total valuation of 1880. Corn and oats, mainly consumed at home and used interchangeably, are most affected by the failure of the maize crop. The average value of corn advanced from 39 6-10 cents in 1880 to 63 6-10 in 1881; oats from 36 to 46 4-10 cents; wheat advanced on an average of 95 cents to \$1.19 per bushel. The values of the cereals produced in 1881 are in round numbers as follows:

Corn	\$759,000,000
Wheat	435,000,000
Oats	103,000,000
Rye	11,000,000
Barley	33,000,000
Buckwheat	8,000,000
Total	\$1,465,000,000

against \$1,163,000,000 in 1880. It is evident from this that the agricultural classes have not suffered from the shortage in last year's crops.

Since the recent destruction by fire of the Potter Building, there has been a large and continued demand for light iron chains, suitable in size and strength for use as fire-escapes from the upper windows of high buildings in case of fire. The idea is a good one and admits of being carried out in many cases where permanent fire-escapes attached to buildings would be unsightly and inconvenient. At small expense, a tenant of an upper story can thus provide a means of escape in case of sudden conflagration, which will answer every practical purpose and be indestructible. A hook fastened to one end will admit of its being attached to any stationary object, and, while not offering a very comfortable means of reaching the street, it would in all cases be preferred to no means at all.

Mr. Jacob Reese and the Basic Process.

Mr. Jacob Reese sends us the following vigorous letter, called out by the letter of Mr. Sidney Gilchrist Thomas, printed in our last issue. As there is evidently a difference of opinion between Mr. Thomas and Mr. Reese, which is not to be wondered at when all the circumstances are considered, we are content to wait until the matter is decided.

PITTSBURGH, Feb. 17th, 1882.

To the Editor of The Iron Age.—DEAR SIR: In your paper this week, under the title "Basic Process," I find a letter written by S. G. Thomas, in which he says: "Any one who will take the trouble to read the various patents issued to Mr. Reese between 1865 and 1877 can readily form his own estimate of the merits of Mr. Reese's recent claims." To this suggestion of Mr. Thomas I wish to add: Any one who, after carefully reading the Reese patents referred to, will then read the evidence in the Reese vs. Thomas, et al., cases, and will then read the paper book of Thomas's attorney of record, in which, after a fight of the giants, he (Thomas's attorney of record) sums up the case in these words (see paper book, page 5): "Accepting Mr. Reese's testimony as true, and we cannot disprove it, he invented the basic process, pure and simple, and the two processes in controversy, in the years 1865 and 1867," and then read the decisions given in my favor, in which these words occur (case A, page 4): "Nothing materially affecting the credibility of Reese's testimony is found in this case; but if such were the fact the evidence, outside of his depositions, is amply sufficient to prove that he invented and successfully tested the subject matter involved in this interference as early as November the 8th, 1867." When the reader is in possession of all these facts cited, he will wonder how an honorable man could so forget himself as to exclude the evidence which is now a matter of fact from his reasoning.

Now, what was this "Case A" which it has been decided that I invented previous to November the 8th, 1867? It is the process of desilicizing and decarbonizing the metal with an air-blast in a silicious-lined Bessemer converter, and then emptying the molten metal into a basic-lined converter, and therein dephosphorizing it in the presence of basic additions by means of an overblow. Now, I submit it is honorable, is it true, when Mr. Thomas says: "A preliminary decision has indeed been given in two cases (A and B), in which Mr. Reese and myself are concerned, which relate to a proposed modification of the basic process." If I invented the basic lining, the basic additions and the overblow previous to November 8th, 1867, how could that invention be a "proposed modification" of Thomas's alleged invention of 1878?

But Mr. Thomas knew when he wrote that unfortunate letter that I had also placed in evidence, in "cases A and B," the fact that I had also "invented the basic process, pure and simple" previous to November the 8th, 1867, as Mr. Thomas's attorney of record admitted in his paper book referred to; and, although only one of Mr. Thomas's patents have been upset as yet, he may rest assured that every one of them will be, so far as they interfere with my rights, as soon as the cases can be reached.

These cases, "A and B," were again argued in Washington on February 15th, and as soon as the decision reaches me I will advise you of same. With thanks to The Iron Age for its fair treatment in this controversy, and grateful remembrance of the many letters of appreciation which I have received, I am, yours truly,

JACOB REESE, Metallurgist.

The Isabella Furnace Record.

We have a copy of the following letter:

PITTSBURGH, Pa., Feb. 18, 1882.

Messrs. Witherow & Gordon, Pittsburgh, Pa.—GENTLEMEN: We are pleased to say that from our No. 1 furnace, 20-foot bosh and 75 feet high, having three of our new type Whitwell hot blasts, each 21 feet diameter and 75 feet high, the product for the four weeks ending this morning, being twenty-eight days in all, was 4850 tons of 2240 pounds per ton; this, with some stopping, getting away cinder, using a mixture of ores about 50 per cent., and adding thereto 50 per cent. of lime, is a record we can all feel proud of. The consumption of fuel was 11-10 tons of coke (two-thirds Blairsville and one-third Connellsville) to 1 ton of iron. The heats of blast steadily maintained were from 1350° to 1400° F. This product has been obtained after a year's work of the stoves and furnace. The stoves show no deterioration in heating power and have cost nothing for maintenance. Yours truly,

(Signed) HUGH KENNEDY.

Manager Isabella Furnace. We are informed that as soon as their arrangements are completed for removing the cinder in cars, the Isabella No. 1 will be worked up to an output of 1400 tons per week. Considering everything, this is probably the best regular working yet reported, and was accomplished without any intention of working for notoriety, as the facts were reluctantly given for publication.

Mr. Richards Corrected.

BESSEMER, Pa., Feb. 20, 1882.

To the Editor of The Iron Age.—DEAR SIR: Mr. Windsor Richards, in his report of the production of ingots of the Edgar Thomson Steel Works and of the Bethlehem Works for November, 1881, reports it as 15,235 and 15,729 tons respectively. It should be 16,235 and 16,729 tons.

I remain, very truly yours,

WILLIAM R. JONES.

An English exchange states that, in view of the defects which recent investigations have shown to exist in the Martini-Henry rifle as compared with several military breech-loaders of private manufacture, plans for a new repeating rifle have been submitted to the War Department, and it is understood that the new weapon is now being manufactured at the Small Arms Factory at Enfield for experimental purposes.

WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., Feb. 22, 1882.

The inconvenience of the delay attending the consideration of the Tariff Commission Bill having been seriously felt by the Committee on Ways and Means in its progress on the McKinley and other measures affecting the duties on iron and steel and other articles, Mr. Kasson was instructed to ask the House to make the Tariff Commission Bill the special order at an early day, and to continue the discussion of the same until disposed of. Mr. Kasson gave notice that he would call up the bill on Tuesday, February 28. At present all bills of the character alluded to are hung up in committee, and unless the measure obstructing the way to action upon them is disposed of or put out of the way, the session will close without the important subject of the duties on iron and steel having been acted upon, and the inconsistencies of court and department decisions remedied. The friends of protection are beginning to show signs of uneasiness. The session is fast passing away, in another week entering the fourth month of its duration, and as yet nothing has been done on any of the necessary measures which have been acted upon by the committee, and which the House might ere this have taken up. The tariff men are now determined to have no more nonsense, and will make the issue. A few Democrats will antagonize it, but many of their number, like Mr. Hewitt, of New York, desire action. The Tariff Commission Bill still drags its weary length along in a spasmodic sort of a way in the Senate. A few days ago Senator Dawes enlivened the subject by overhauling the record of Senator Vance, of North Carolina. The Senator from the State of turpentine and peanuts had been indulging in an elaborate essay on the subject of a tariff commission, which had been unearthed from the mazes of the Senate calendar long enough to accommodate him. The Senator from Massachusetts showed that he did not vote for the Tariff Bill of 1860, although he belonged to what were known as the South Americans, who were a thorn in the side of the Democracy in those days. He said that the Senator did not vote on the motion to lay upon the table, and did not vote upon the passage of the bill, but was paired with one who would have voted for it. This unexpected attack caused considerable sensation, especially on the Democratic side. The Senator from North Carolina, however, took the matter quite philosophically, remarking: "I have no objection to that record, Mr. President." The question in the Senate is getting decidedly partisan. There are still a number of speeches to be let off, so, with the interposition of other business, it is impossible to say when a vote will be reached. The chances are that the House will now dispose of the question before the Senate gets through with its drowsy effusions.

The following is the text of the report of the Committee on Ways and Means, submitted by Mr. Kasson to the House of Representatives, and covers the only amendments which are recommended by the committee to the bill to create a commission to investigate the tariff.

REPORT TO ACCOMPANY BILL H. R. 2315.

The Committee on Ways and Means, to whom was referred the bill (H. R. 2315) to provide for the appointment of a commission to investigate the question of the tariff and internal-revenue laws, report the same back to the House with the following amendments: In line 7, section 3, strike out the words, "and the existing system of internal-revenue laws." Strike out the 4th section, and insert in lieu thereof the following: "Sec. 4.—That the commission shall make to Congress final report of the results of their investigation, and the testimony taken in the course of the same, not later than the first Monday of December, 1882, and they shall cause the testimony taken to be printed from time to time and distributed to members of Congress by the public printer; and shall also cause to be printed, for the use of Congress, 2000 copies of their final report, together with the testimony." Amend the title by striking out the words, "and internal-revenue laws." And, with these amendments, the committee recommend the passage of the bill.

NEW PUBLICATIONS.

DIE ANLAGE UND EINRICHTUNG DER EISENHÜTTEN. By Anton Ritter von Kerpely. Published by Arthur Felix, Leipzig, Germany.

This work, of which we have just received the fifth volume, contains a large amount of practical information for blast furnace men and mining engineers. The author gives profusely illustrated and interesting descriptions of the various coke ovens and stoves for fuel used on the Continent, together with estimates of the cost of erection of the plants. The methods and materials employed in the construction of the buildings used for the mixing of ores are also dwelt upon, and finally the principles involved in the construction of blast furnaces are considered. We cannot devote the space necessary for a complete description of the work, but will say that its contents deserve more than ordinary attention, and think that the time devoted to its perusal will be amply repaid by the information gained.

Our recent English exchanges bring the news that the Otto patents upon gas engines have recently been confirmed in a suit of Otto against Linford. The particulars are given at great length, but we think will have little interest for our readers. It is sufficient to note that the Otto patents particularly have been very completely sustained, the Court of Appeal having quashed Vice-Chancellor Bacon's judgment and granted an injunction against Linford, declaring the plaintiff entitled to damages for the infringement. Some doubt having been cast on the validity of the Otto patents by the previous decision, it will be set at rest by the one just rendered.

Mr. B. B. Hotchkiss, an American, inventor of the revolving cannon which bears his name, has been knighted by the King of Denmark.

AMERICAN INSTITUTE OF MINING ENGINEERS.

(By Telegraph to The Iron Age.)

WASHINGTON, February 22, 1882.

There is a very large attendance both of members and ladies. At the first session last evening, General Sherman welcomed the Institute on behalf of the Regents of the Smithsonian Institute, and Major Powell on behalf of the local members, after which a brilliant reception was given by Major and Mrs. Powell, at their residence. Several interesting papers were read this morning. The Holley memorial service this afternoon was most impressive. Doctor Raymond presided, and addresses were made by Mr. Metcalf, Doctor Raymond, Dr. Sterry Hunt, Mr. Shinn, E. D. Leavitt, Captain Dutton, Robert W. Hunt, A. S. Hewitt, Professor Eggleston, Professor Maynard, Messrs. E. C. Clarke, Ricketson, Holloway, Chanute, MacDonald, and Weeks, who presented resolutions expressing the sense of the meeting and its sympathy with the relatives of the deceased and with sister societies; inviting Doctor Raymond to deliver an address at a suitable time, and arranging for the publication of the same and memorial exercises. The addresses expressed most forcibly and touchingly the great regard and love of the members for Mr. Holley, a sense of the wonderful versatility of his talents and appreciation of his achievements. The evening session was devoted to a discussion of iron and steel structural material.

OBITUARY.

CHARLES ROBINSON.

Mr. Charles Robinson, who died at Raynham, Mass., on the 8th inst., had attained the venerable age of eighty-one years. He was born in Bridgewater in 1800, and belonged to a family which has been largely identified with the manufacture of iron in Plymouth and Bristol counties for over a century. He was the son of Dyer Robinson, whose wife was Nabby Stetson, and they had a family of six sons and three daughters, only three of whom now survive. They were a stalwart family, all of the sons excepting Charles being over six feet in height, and all were engaged in the iron business. Charles and his brother Enoch went to East Taunton about the year 1828, and have seen a large establishment and a thriving village grow up around them, almost wholly through their own efforts and business capacity. Charles was at first clerk for Horatio Leonard & Co., who had a small iron works there, which was succeeded by the Taunton Iron Company and later by the Old Colony Iron Company, of which he had been business manager and treasurer for about forty years, positions he has filled all these years with marked ability until his death. He has also been a director in many other local manufacturing corporations. Mr. Robinson celebrated his golden wedding on Thanksgiving evening, 1875. The family has a remarkable record of longevity. Mr. Robinson leaves a widow aged 76 years. He also leaves three sons and a daughter. The funeral was observed at his late residence. The works were closed and there was a very large attendance.

JOSEPH E. SHEFFIELD.

Joseph E. Sheffield, after whom the Sheffield Scientific School of Yale College was named, died at his home in New Haven, February 16. Born in Southport, Conn., June 19, 1793, he at fourteen years of age, with only a common school education, began to care for himself. He made two sea voyages, and then became a clerk in Newbern, N. C. In 1812, while Mr. Sheffield was on a visit to his parents, war with Great Britain was declared. He ran the blockade maintained by British cruisers off Sandy Hook, and established a profitable trade between Newbern and New York. He became partner in a mercantile house in Newbern in 1815. In the following year he rode 1000 miles on horseback and finally located at Mobile. Here he conceived the idea that Mobile could be built on a better commercial site. The city then contained only about 1000 inhabitants and a small garrison. Josiah Blakely, a New York merchant, had, prior to the cessation of the Spanish claim, seen that the original settlement on the west side of Mobile Bay was not as eligible for shipping and large business purposes as a settlement would be on the east side. He accordingly bought a large tract of land, which he called Blakely, and in 1816 Peter & Stebbins, of New York, and Coolidge & Bright, of Boston, and Mr. Sheffield commenced building on a large scale in "Blakely," erecting wharves, warehouses, stores, a schoolhouse and a church; but the vested interests of 1000 inhabitants and an established trade proved too much for the young firm, and Mr. Sheffield retired, with his partners, to prosecute his regular mercantile career in their first location in Mobile.

Mr. Sheffield's rise was now rapid. He became associated with Henry Leland, of New York, and was subsequently one of the largest shippers of cotton and the confidential director of Mr. Biddle, of the Mobile branch of the United States bank. In 1822 he married Miss Maria St. John, daughter of Col. T. St. John, of Walton, Delaware County, N. Y. In 1835 he removed to New Haven that his family might have better educational advantages. He purchased property adjoining his house for the sole purpose of converting the buildings which occupied it into accommodations for class rooms, laboratories and library for the Sheffield Scientific School, and he also put up another building for the school, which aggregated in cost over \$400,000. In 1840, in company with other capitalists, he bought a majority of the stock of the New Haven and Northampton Company, which had broken down in the effort to construct the Farmington Canal, which had been begun under the auspices of De Witt Clinton, of New York. The work was not completed and operated until 1844. Mr. Sheffield in the latter year advocated a railroad in place of the canal, and after making a trip to Europe he pushed the project to partial success, constructing, with a few friends, the road to Plainville, Conn. Opposition led him to lease the road to the New York and New Haven Railroad Company. He is entitled to the credit of

seeing the practicability of the New York and New Haven road, and obtained the first charter for the construction of that road in May, 1844, through the agency of Judge Hitchcock, and had the preliminary survey made at his sole expense. President Schuyler's management induced him to withdraw from the directorship and to sell out his stock before it had depreciated. In the railroad over the old route of the Farmington Canal he associated with himself Henry Farnam, of New Haven. In October, 1850, having a large farm in Chicago, he went West with Mr. Farnam, and the result of this trip was the construction of the Rock Island and Chicago road by Messrs. Sheffield and Farnam at an expense of \$5,000,000. These men originated the famous excursion which celebrated the opening of the road from Chicago to Rock Island, which was participated in by President Fillmore, members of his Cabinet and many dignitaries. Mr. Sheffield was a director of the road until 1855, when he resigned and went to Europe to reside for two years.

Besides his large donations to the Yale Scientific School, he gave Trinity parish, New Haven, a large property, and endowed a school and home in Trinity parish. He also made handsome gifts to the Berkeley Divinity School, in Middletown; Trinity College, in Hartford, and the Theological Seminary of the Northwest, in Chicago. To the latter he gave three-quarters of a square of 20 acres in Chicago. His benefactions for educational purposes alone are estimated to have exceeded \$500,000. In one year he gave the Sheffield Scientific School \$50,000 to endow professorships. For several years he paid the school—on consideration that it should be kept a secret—\$10,000 annually. Mr. Sheffield's modesty and desire to avoid publicity were some of his leading characteristics. He leaves a widow, who enjoys good health although above fourscore years of age, and six children. Death resulted from a disease of the kidneys. He died possessed of a very large property, much of which consisted of valuable real estate in Chicago and in the South, in bank and railroad stocks and a splendid residence and grounds in New Haven.

JOHN COOKE.

John Cooke, the president of the Danforth Locomotive and Machine Works, at Paterson, N. J., died on the 20th inst. His father (Watts Cooke) emigrated to this country from the north of Ireland and settled at Matteawan, Dutchess County, N. Y. The subject of this sketch, when he was only eight years old, worked in a cotton mill, and afterward learned the trade of a machinist. About 1840 he went to Paterson, and was employed for some years in the Rogers Locomotive and Machine Works, where his father-in-law, William Swinburne, was superintendent. In 1848 Mr. Swinburne formed a new partnership in locomotive building, and Mr. Cooke was appointed superintendent of the Rogers Works. Four years later he was taken into the firm of Charles Danforth & Co., the new firm being known as Danforth, Cooke & Co. He subsequently became president of the Danforth Locomotive and Machine Works, a position he held at the time of his death. He made a number of improvements in locomotives, and devoted a great deal of time to the study of ancient history. In 1866 he went to Europe, and from there to Palestine, and made a voyage up the Nile. He was one of the principal stockholders in the Passaic Rolling Mill Company, and was also a large stockholder in the First National Bank in Paterson, and had been vice-president of that institution since 1870. For many years he was one of the most generous supporters of the Second Presbyterian Church. He was an earnest supporter of the Republican party, and was once elected alderman, and for two years presided over the Board of Education. He was in the fifty-eighth year of his age, and his death was due to a general breaking down of the system. His estate is estimated to be worth about \$350,000.

GEORGE G. SAMPSON.

Mr. George G. Sampson, of No. 56 Pine street, died on the 20th inst. of an intestinal complaint. Deceased, who some years ago practically retired from business, was at one time head of the firm of Sampson Brothers, dealers in iron. He was one of the directors of the Bank of the Republic, and a prominent director of the Atlantic and Pacific Telegraph Company until its consolidation with the Western Union. Of late years he has taken a special interest in the Southern Aid Society, of which Boorman Johnston was first president, and succeeded the late Gerard Hallock and Mr. Lucius Hopkins as treasurer of that institution.

Electricity from Crystals.—It has been shown that, by the mere compression of an inclined hemihedral crystal, electricity is developed. Experiments were made by placing a crystal, or a suitable section of it, between two sheets of tinfoil, insulated on the exterior by plates of eucalyptus, the tinfoil being connected with a galvanometer. By compressing the crystal into a vise or otherwise, electricity was developed and measured by the galvanometer. The electricity developed is the opposite of that produced by heating a crystal; that is to say, the extremity of the crystal which becomes positive on heating, becomes negative on compression. On releasing the pressure, electricity of an opposite kind is produced. It was also found that the electricity by pressure can only be obtained from hemihedral crystals having inclined faces. By combining a number of inclined crystals in a pile, an apparatus for producing electricity has been invented. The amount of electricity developed varies for different materials, a section of quartz, cut perpendicular to the main axis, evolving more than a similar section of tourmaline.

The metal stern for the new armor-clad Imperieuse has been successfully cast at Portsmouth, England, and is the largest ever made at any dockyard in connection with shipbuilding. It weighs 34 tons, and has a span of 50 feet from tip to tip, while the height from the end of the armor-plate piece is 30 feet. The metal used consisted of copper, zinc and tin, and was prepared in two cupola blast furnaces and one air furnace.



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Hand, Panel, and Rip Saws,

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WM. A. CLARK'S PATENT EXPANSIVE BITS WITH TWO CUTTERS EACH,

Small Bit Boring from ½ in. to 1½ in.; Large Bit Boring from ¾ in. to 3 in. Warranted.

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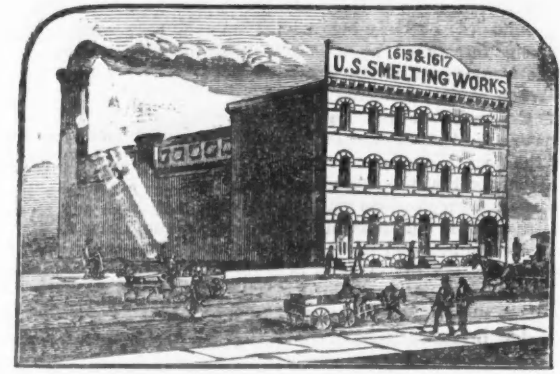
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See The Iron Age first issue of each month.

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BRASS CASTINGS, CAR BEARINGS and SOLDER

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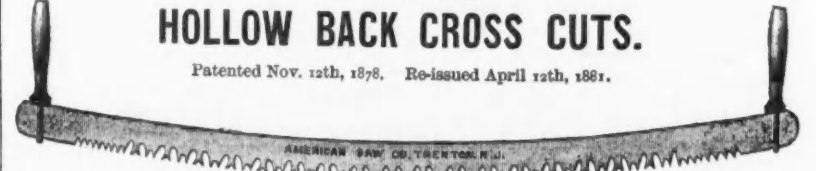
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It is self-locking and perfectly secure. It is made of brass and finished by our patented process. The above cut represents the only size yet made, but other sizes will be furnished as soon as the requirements of the trade are known.

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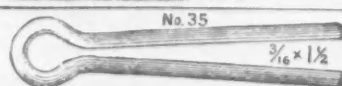
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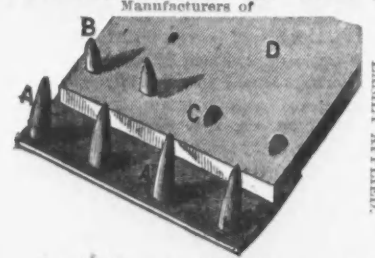
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with Water, Wine and Milk Cooler. Best Food and Ice Preserver in the world. Send for Book. A. M. LESLEY, 780 Sixth Avenue. Also the Rotunda Furnace.

No. 35



BROWNING, SISUM & CO., 85 Chambers St.,
Manufacture
Belt Hooks, Cutters, Spring Keys, D Rings,
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Factory, BROOKLYN.



cher's Patent Belt Fasteners.
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Successors to W. R. Baker & Co.,
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MANUFACTURERS OF
REVOLVING BOLT AND SCREW CASES.



We take pleasure in informing the Trade that we are sole owners and manufacturers of the above very useful article, which no retail Hardware Dealer should be without, as they prevent mixing of Screws or Bolts, enabling him to keep his stock in good shape; and in convenience alone will pay for themselves in a very short time. They are Compact, Substantially Made, Handsomely Finished, and present a highly ornamental appearance on the counter. The drawers are provided with stops to prevent their removal from the case.

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THE AMERICAN

Ventilating Sash Lock,

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A SECURE LOCK FOR SASH,

ADMITTING A

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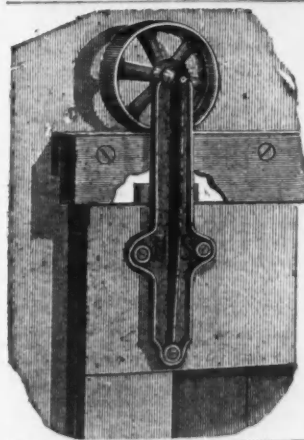
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**DROP FORGINGS
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AGRICULTURAL IMPLEMENT AND
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THE U. S. WOOD TRACK BARN DOOR HANGINGS.

Patented April 13, 1866; Relapsed Jan. 11, 1881.
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This patent covers all rail with a recess in the under side. By using these Hangers you save the cost of iron rail. They cannot be thrown off the track.

We also manufacture
THE RIDER WOOSTER, and CHAMPION
ANTI-FRICTION, and CHECK-BACK
HANGINGS, RAIL, STAY ROLLERS, &c.
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MEDINA MANUFACTURING CO.,
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HEMACITE HOUSE TRIMMINGS,
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Manufacture Trace, Coll. Ox, Log and Wagon Chain, Fifth Wheels, Shackles and King Bolts, using only Iron made at our mills from strictly selected Wrought Scrap.

OFFICE, 30 West Third Street. MILLS & WORKS, Gest & C. H. & D. R. R.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Wheeler Combination Metal Company have started up at Portsmouth with a capital of \$50,000.

The Concord Machine Works, Concord, have grown into a large and important industry. There is now in operation seven iron planers, twenty-five lathes of different kinds, five upright drills, bolt cutters and pulley lathes. There are now employed at these works forty men, which will be increased to fifty from day to day, as men can be obtained, who are working thirteen hours a day, five days in the week. The amount of castings used is from 20 to 25 tons per month, besides a large quantity of steel and wrought iron. During the past four years 1300 machines of various kinds have been built and sent out. Last month there were shipped from the shop forty machines, and this month the number will reach sixty. There are now in process of construction 112 machines of various kinds for almost as many different uses.—*Boston Commercial Bulletin*.

The financial agents of the syndicate interested in the purchase of the Franconia iron property, at Franconia, are Boston capitalists. The transaction is to be noted as one of vast importance to New Hampshire interests in promoting the growth of her industrial enterprises. The operations of her iron industry were given great prominence in times past by the successful working of these Franconia iron mines, whose large and valuable product made them famous throughout the country. The organization of a company is being perfected and will be announced when completed, and the development of the property will be soon begun.

VERMONT.

It is expected that the recently burned horse nail works at Vergennes will be rebuilt.

MASSACHUSETTS.

The Lamb Knitting Machine Company, Chicopee Falls, have increased their capital stock to \$200,000.

The Lowell machine shop is very busy. They are filling large orders for Nashville, Tenn., Nashua and Manchester, N. H., and Boston.

The Whitehead & Atherton Machine Company have received the order for the entire picking machinery for the new Bourne Mills, Fall River.

The stock held by the Rodney Hunt Machine Manufacturing Company in the Orange Iron Foundry Company, at Orange, has been bought by the New Home Sewing Machine Company. The transfer was made on February 11. Thus the Gold Medal Sewing Machine Company and the Orange Iron Foundry Company have ceased to exist, for they are blended in the New Home Sewing Machine Company, and will be under the control of one set of officers.

Several prominent capitalists at Fall River are considering the advisability of forming a corporation for the manufacture of shovels, for which there is said to be a steady demand, and at profitable prices.

CONNECTICUT.

At New Britain the Union Manufacturing Company are building an addition to their new foundry.

The Scovill Manufacturing Company, of Waterbury, have built a new rolling mill.

The Wilcox Silver Plate Company, of Meriden, are about to erect a \$30,000 addition to their works.

The Hartford Shearer Company has been organized with a capital of \$500,000, and the company will engage in the manufacture of machines for shearing sheep or the skins of other animals.

PENNSYLVANIA.

The United States Smelting Works (Stokes & Hunt), Philadelphia, received a medal and diploma for their exhibit of Babbitt metals at the Atlanta Exposition. The business of the firm has extended very rapidly throughout the United States, and last week they received an order for some of their genuine Babbitt metal from a house in Leipzig, Germany, for use in connection with wood-working machinery.

S. J. Crosswell, Philadelphia, has received orders from Bay City, Mich., for several iron fronts for new stores, which are being built in that city.

Messrs. Boone & Co., of the Stony Creek Iron Works, are working double turn day and night with fully 200 hands. They are so overrun with orders that they cannot produce sufficient rough iron at their own works, and have to purchase muck bars to meet the demand for plate iron.

The Cambria Iron Company last fall bought the plover plant in Allegheny City of Messrs. Reed & Thaw, to attach to it the plover shop of the Gaultier Steel Department. The new building for the works is now completed, and Reed & Thaw's machinery is arriving by rail. It is expected that the whole will be set up and in working order by the last of this week.

A new double furnace has just been put up in Melvin & Son's Rolling Mill, Reading, and will be put in operation in a few days. A number of other improvements are in contemplation, among which is the introduction of the electric light. Owing to the brisk business done by this firm a large number of men are employed, who are at present working double turn.

A new iron company, composed of townsmen, Mr. George Boyce, Mr. E. A. Wheeler and others, under the firm name of Boyce, Wheeler & Co., will hereafter operate the old Shenango Furnace property at Middlesex. They are now demolishing the two old Shenango stacks, and will build in their place one large stack, to be called Ella Furnace.

Isabella Furnace, in West Nantmeal, Chester County, after a struggle of eight or ten days has finally chilled thoroughly with a large body of ore in the stack. This is the second time the furnace has chilled this winter and denotes bad management somewhere. A number of workmen are thrown out of employment.

It is reported that a Philadelphia party has purchased 3½ acres of land in Coatesville, on the Wilmington and Northern Railroad, on which they propose to erect a mill for the purpose of rolling bridge iron.

No. 3 blast furnace of the E. & G. Brooke

Iron Company, at Birdsboro, which was blown out some time since for repairs, is being thoroughly overhauled and put in shape for work. The bricklayers have almost completed their labors, and the remainder of the work necessary to be done will be pushed forward as fast as possible.

The Lucinda Furnace, near Norristown, is now making on an average 145 tons a week, the highest product being 167½ tons. They are making at present what is known as "model" and white iron, and use a good deal of mill cinder. About thirty hands are employed.

The Rochester Tumbler Works is probably the only enterprise of its kind in existence where natural gas is used for annealing glassware.

PITTSBURGH AND VICINITY.

The Union Storage Company have in course of erection, on the corner of Twenty-fifth and Railroad streets, a large brick warehouse building, 120 x 120 feet. The building will be completed about the first of April next. The company will then be prepared to receive on storage all kinds of merchandise, besides pig iron, blooms, lumber and other articles. The company's warehouse and yards are located on the line of the Allegheny Valley Railroad. They receive and deliver goods either by cars or wagons.

Mr. R. J. Anderson denies the circulated report that he was prospecting in Cumberland, Md., with a view to giving up the establishment here and starting up in Cumberland. His visit there was made in company with a number of his employees, who were looking at an old steel works at that place which they were thinking of starting up on the co-operative plan. They found there was a 24-pot steel furnace in rather poor condition, and after taking everything into consideration came to the conclusion that it would not pay.

Mackintosh, Hemphill & Co. are building a vertical high-speed engine, for running the rolls of the Edgar Thomson rail mill, that will make 300 revolutions per minute and connect directly with the train of rolls.

The New York Plate Glass Company's works, at Hite's Station, on the West Pennsylvania Railroad, twenty miles from Pittsburgh, are nearly completed, and will be in operation May 1. The company have made all their own patterns, have their own foundry and machine shops, make their own bricks and furnish all the materials as well as erected the various structures. The only outside work they had done was the boilers, which are six in number. They have made connection with Graff, Bennett & Co.'s gas well, and are sinking wells of their own. They expect to run the entire works by means of natural gas. Mr. Ford, who is president and general manager of the company, has his house also lighted with gas from the well. The Allegheny River furnishes quicksand for grinding the glass. An immense quantity of sand is used for this purpose, and a couple of sand diggers will be kept constantly employed to supply it. There is a supply of coal on the entire tract upon which the works are built, and this land has appreciated in value to the extent of \$80,000. There are several Pittsburghers and Eastern men interested in this enterprise, and the capital stock of the company is \$1,000,000.

The boiler-explosion tests of Mr. D. P. Lawson, which were to have come off at the Munhall Farm last week did not take place, owing to some breakage about the boiler. The tests will probably be made this week.

OHIO.

The Goblet Works, Bellaire, now occupy the works formerly known as the Ohio Glass Factory, and will employ 200 men, boys and girls. This concern has a capacity of 200,000 pieces a day.

Milliken, Boyd & Co., Youngstown, are running full time on a number of orders for freight cars. Their new works at that place are well appointed in every department, and they are prepared to contract for the best standard of cars. The firm is making an iron car for dumping purposes which has excited favorable comment.

The Calwell & Collins Norway Bolt Company, Cleveland, are having an excellent run of trade for their bolts both East and West, and are doing some export business.

KENTUCKY.

Ashland Furnace is turning out about 70 tons per day.

The output of the Norton Iron Works for last week was 3853 kegs.

Trigg Furnace and lands, in the southwestern part of the State, are advertised to be sold on March 13, at commissioners' sale. Trigg Furnace is a charcoal furnace, measuring 48 x 12 feet, and is arranged for either hot or cold blast. She has made, when in operation, about 130 tons a week. The ore mines on the property are reported to be very valuable.

INDIANA.

The foundry, machine shop and blacksmith shop of the new steel rail mill of the Indianapolis Rolling Mill Co. are already up and in operation. The steel mill is nearly ready for the roof, which is to be of iron. The machinery is all ordered and considerable of it is on the ground. The company expect to have all completed except the converting department by June 1st.

ILLINOIS.

The drop forging works of the Chicago Steel Horse Shoe Co., at Pullman, are now in operation, and are running successfully. The company are now prepared for business in this line, and will make a specialty of forgings for agricultural implements.

The Chicago Steel Works are running double time.

The Chicago Splice Bar Mill is being thoroughly remodeled. The proprietors, Messrs. Morris, Sellers & Co., intend to double the present capacity of the works.

The plans are perfected for the new works of the Northwestern Horse Nail Company, at Brighton, and it is expected that the establishment will be in running order by July 1. The buildings are to be of brick, will cover about 75,000 square feet of ground, and are to be situated so as to form a hollow square. The two large buildings will be 80 x 350 feet; the buildings connecting thereto will be 80 x 86 feet, leaving a yard 160 x 186 feet and side tracks connecting with the C. & A. and P. C. & St. Louis Railways, and the stock-

yards tracks will be so arranged that the iron will be received at one corner of the square and the nails delivered at the other. A new 75 horse-power engine, as well as a battery of five boilers of 100 horse-power each, including 80 to 100 forging machines and 50 to 60 finishing machines, will be added. Two hundred and fifty men will be given employment, and the capacity of these immense works will be from 2000 to 2500 tons of manufactured nails per annum.—*Industrial World*.

All the blast furnaces of the Union Iron and Steel Company are still banked, except the old No. 1 stack, which has started up.

A \$15,000 purse is about to be donated to the movers of the rolling-mill enterprise at Brazil.

The new site of Fieldhouse, Dutcher & Baldwin, at South Chicago, consists of some five acres of ground, upon which they will at once erect a pipe mill, 60 x 200 feet; a warehouse, 60 x 100 feet; and coke and iron sheds, 40 x 150 feet. They will remove from their present establishment all the machinery, &c., adding four more furnaces, altogether doubling their former capacity. To the above will be also added a foundry and general machine shop. The city offices will be retained, and to the present warehouses will be added a two-story brick building, 40 x 60 feet.

MISSOURI.

We clip the following items regarding the industries of St. Louis from the *Age of Steel*: Business is reported good at the Globe File Works, with a number of large orders on hand. A full force of men in all departments is employed at Buck's Stove Foundry. Eighty stoves are now turned out daily. The Bridge-Beach Stove Company are busily engaged on a large addition to their foundry and are making other improvements. The Granite Iron Rolling Mill has been shut down for a few days this week while repairs have been made on the engine and some of the machinery. Business with the Helmbacher Forge and Rolling Mill Company is not so good as it was last month, but an improvement is anticipated in March. Green's Car Wheel Manufacturing Company find business good in the manufacture of all kinds of machinery castings, and their fifty men are fully employed.

MICHIGAN.

Six acres of land in Niles have been purchased by a new corporation called the Niles Chilled Flow Company, who will erect works at the expense of \$20,000 for the manufacture of their specialty.

NEBRASKA.

The Omaha Nail Works have increased their capital to \$100,000 after the first year's business. The works were run but 159 days during 1881, mainly owing to the placing of new machinery, which amounted to \$20,000 worth, making a total cost of \$75,000. The capacity of the works has been doubled. The works earned last year, though running but little over half time, 8 per cent. on the capital stock.—*Chicago Industrial World*.

CALIFORNIA.

The California Iron and Steel Company have been incorporated to work deposits of iron ore in the counties of Nevada and Placer, in that State; also to construct rolling mills, furnaces, &c. The amount of capital stock is \$2,675,000.

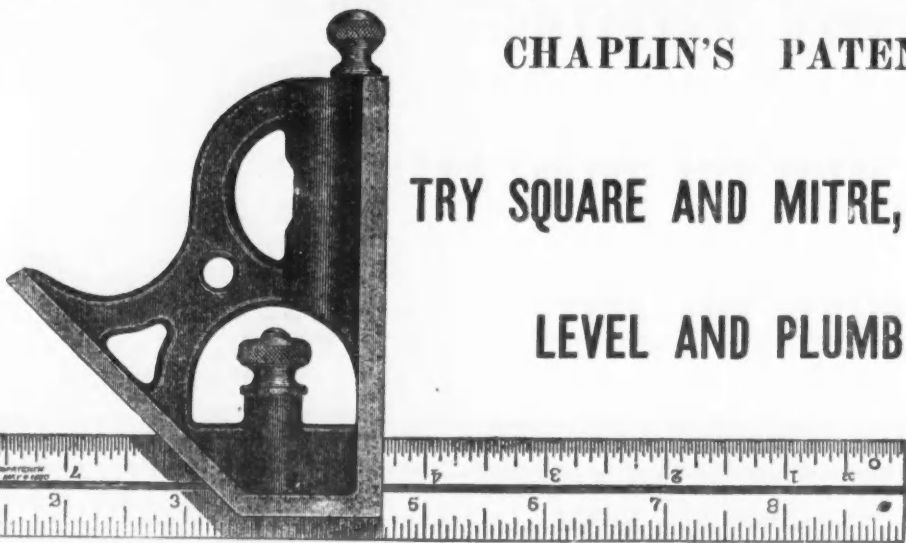
The Wheeling Nail Trade.—Below will be found an interesting tabulated statement of the capital stocks of the nail mills in the Wheeling district, with the dividends of the last two years. It is taken from the *Bellaire Independent*, which says: The distribution of \$712,000 as dividends from seven mills alone, and all situated within a radius of six miles, is a showing that should make the people in this part of the Ohio valley feel particularly good. That much money in a single year disbursed from one industry alone is exceedingly flattering to this section of the country as a place for the successful operation of manufacturing of all kinds. It speaks volumes in itself, and needs no further comment. Our Bellaire works show well after having made such permanent improvements as they have during the past year. Following is the table:

	Capital.	Div'd July '81.	Div'd Jan. '82.	Total
Benwood Iron Works.....	\$500,000	10%	15%	\$125,000
Bellaire Nail Works.....	500,000	8%	15%	115,000
LaBelle Iron Works.....	400,000	3 of 10 each		120,000
Riverside Iron Works.....	800,000	10%	10%	172,300
Belmont Nail Company.....	400,000	5%	15%	80,000
Etna Iron and Nail Co.....	200,000	10%	10%	40,000
Top Mill.....	400,000	5%	5%	40,000
Total.....	\$3,200,000			\$920,000

Values of the Standard Coins of the Various Nations.—The following official valuation of the different coins in circulation in the world has been made by the Director of the Mint:

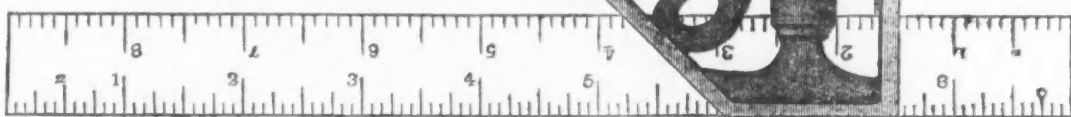
Countries.	Monetary Unit.	Stand'd.	Value in U. S. money.
Austria.....	Florin.....	Silver.....	40 c.
Belgium.....	Franc.....	Gold & sil.....	19 c.
Bolivia.....	Boliviano.....	Silver.....	82 c.
Brazil.....	Mil's of 1000 reis.....	Gold.....	54 c.
B. Pos. N. A.....	Dollar.....	Gold.....	\$1.00
Chile.....	Peso.....	Gold & sil.....	91 c.
Cuba.....	Peso.....	Gold & sil.....	91 c.
Denmark.....	Crown.....	Gold.....	26 c.
Ecuador.....	Peso.....	Silver.....	52 c.
Egypt.....	Piaster.....	Gold.....	94 c.
France.....	Franc.....	Gold & sil.....	19 c.
Great Britain.....	Pound sterling.....	Gold.....	\$5.00
Greece.....	Drachma.....	Gold & sil.....	10 c.
German Emp. Mark.....	Mark.....	Gold.....	23 c.
Haiti.....	Gourde.....	Gold & sil.....	95 c.
India.....	Rupee of 16 annas.....	Silver.....	39 c.
Italy.....	Lira.....	Gold & sil.....	19 c.
Japan.....	Yen.....	Silver.....	85 c.
Liberia.....	Dollar.....	Gold.....	1.00
Mexico.....	Dollar.....	Silver.....	80 c.
Netherlands.....	Guilder.....	Gold & sil.....	40 c.
Norway.....	Crown.....	Gold.....	26 c.
Peru.....	Sol.....	Silver.....	82 c.
Portugal.....	Mil's of 1000 reis.....	Gold.....	1.00
Russia.....	Rouble of 100 c.....	Silver.....	65 c.
Swich Isl's.....	Dollar.....	Gold.....	1.00
Spain.....	Peseta of 100 c.....	Gold & sil.....	19 c.
Sweden.....	Crown.....	Gold.....	26 c.
Switzerland.....	Franc.....	Gold & sil.....	19 c.
Tripoli.....	Ma'bab of 20 p.....	Silver.....	74 c.
Turkey.....	Piaster.....	Silver.....	94 c.
U. S. Colonies.....	Peso.....	Silver.....	82 c.
Venezuela.....	Bolivar.....	Gold & sil.....	19 c.

Experiments with the Lawson boiler have been renewed on a farm near Pittsburgh, under the direction of the United States Supervisory Inspector of Steamboats, assisted by a number of naval officers.



CHAPLIN'S PATENT
TRY SQUARE AND MITRE, SPIRIT
LEVEL AND PLUMB.

CENTER SQUARE
AND
DRAUGHTSMAN'S T-SQUARE.

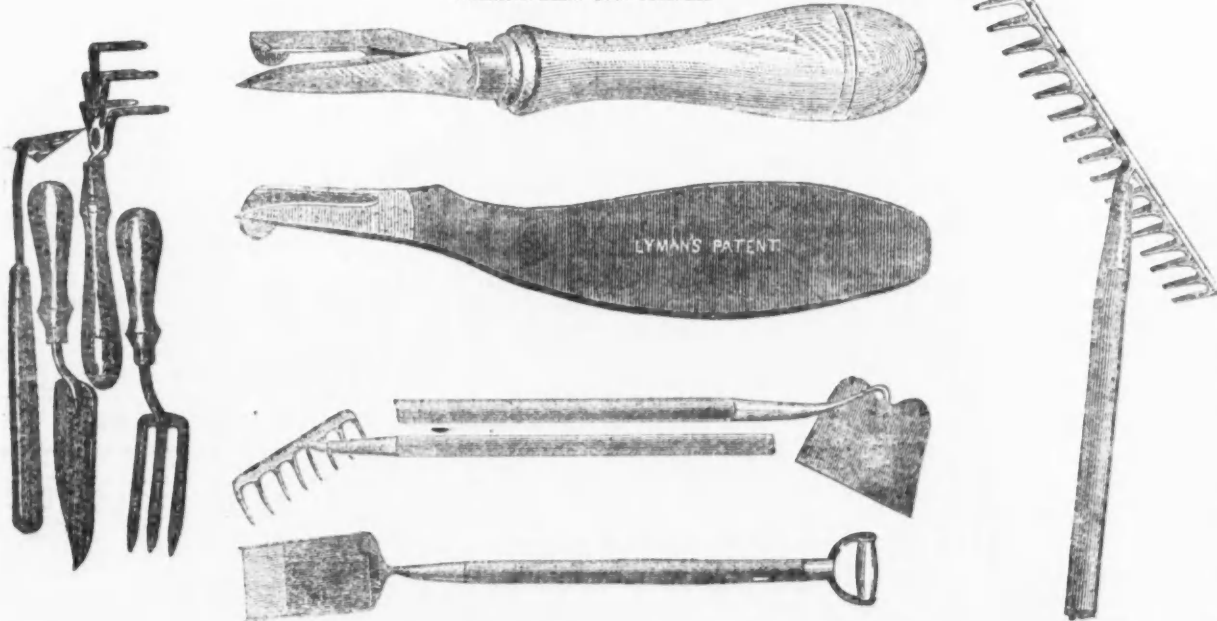


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ATHOL, MASS.

Sole Manufacturers and Owners of the Patent.

Circular, with Price List and Discounts, on Application.

WORLD'S BEST CAN OPENER.



The above illustrated Garden Tools are a few of the goods we make. Having new Factory new Designs, new Patterns and new Outfit, we feel justified in asking the trade to remember us in placing orders.

LESTER & LYMAN MANUF'NG CO.,
MILLERS FALLS, MASS.

GRAHAM & HAINES, General Agents, 113 Chambers Street, New York.

New York Club Roller Skates.

THE MOST DURABLE of any MADE.

Easiest Working and Lightest.

Low Price and Excellent Quality. Also, Wood Top Roller Skates



W. A. SUTTON,

Manufacturer of Ice and Roller Skates.

522, 524, 526, 528 and 530 WEST TWENTIETH ST.,
NEW YORK.

LOW MOOR IRON COMPANY,
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PIG IRON.

Best Foundry Iron for Sale in Lots to Suit.

GEO. H. WHIPPLE, 56 Wall St., New York.

THE ECLIPSE WAGON JACK

is the SIMPLEST, CHEAPEST and most CONVENIENT in the market. It will raise a 2000-POUND wagon, and is made of the best hard wood, riveted with iron rivets. The BEARING on the bottom is LONG, and the JACK remains FIRMLY in place in use. A SAMPLE will be sent upon receipt of \$1.00. LIBERAL DISCOUNTS to the trade. Sole Agent,

T. C. CONWAY,
11 Chambers St., New York

The Derby Expansion Bit.

All users of boring tools will be interested in what is called the "Derby" bit, now being put upon the market by the Derby Bit Co., of Ansonia, Conn., the general features of which are clearly shown in the accompanying

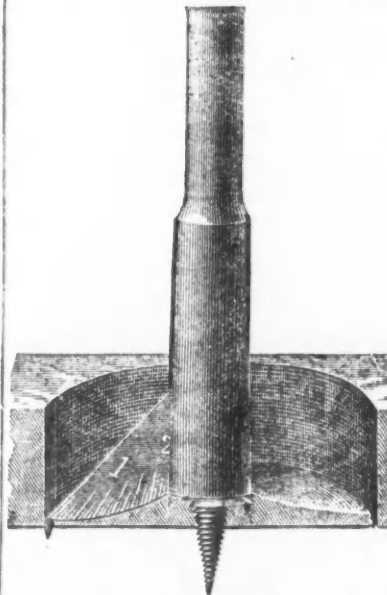


Fig. 1.—General View of the Tool in Boring Through a Board, the Spur Cutting through the Bottom.

ing illustrations. The special advantages which this tool possesses, and to which the manufacturers direct particular attention, are positive action, ready adjustability and simplicity of parts. The segmental lip, two views of which are afforded in Fig. 4, slides

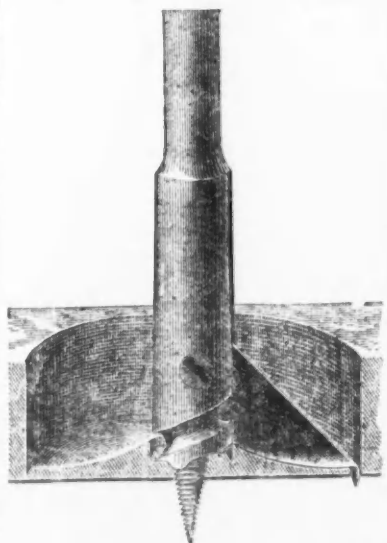


Fig. 2.—The same with the Segmental Lips in the Opposite Position.

into a slot in the side of the shank, an indication of which may be noticed in both Figs. 1 and 2. This is held in place by means of a single screw. One side of the lip is graduated so as to make it readily adjustable for various diameter of holes. The bit is cal-

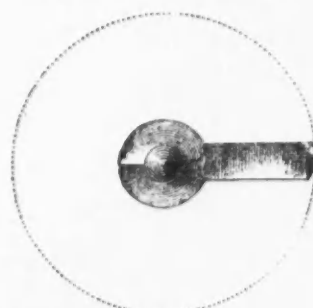


Fig. 3.—Bottom View of the Tool.

culated to cut from $\frac{1}{8}$ inch to 2 inches in diameter. By examination of Figs. 1 and 2, it will be seen that the segmental lip with its spur cuts slightly in advance of the spur upon the shank. The effect of this is to leave sufficient thickness of wood in the bottom of the hole at its center to carry the bit until



Fig. 4.—Face and Back View of the Lip.

the spur upon the segmental cutter shall have cut through, thus preventing splintering on the under side. Fig. 2 represents the segmental lip at one portion of the revolution, while Fig. 1 shows it after it has advanced a half revolution. Fig. 3 represents a bottom view of the tool as it would appear in use. The cuts represent the instrument full size.

The Kings County Supreme Court, composed of Judges Barnard, Gilbert and Dykman, decide against granting to the East River Bridge and Long Island Steam Transit Company the right to construct an elevated road in that city. They concur in the view that there should be no rapid transit without compensation for actual damages to property owners on the line of the road.

LABOR AND WAGES.

Some of the puddlers who have had a difficulty with their employers, the Phoenix Iron Company, applied at Schall's Rolling Mill, Norristown, and at the Pottstown mill for work, but were refused, although their services were needed. These companies have issued orders to employ no one interested in the recent troubles at the Phoenix Iron Works. It is reported that Thomas McQuade, president of the Phoenixville Branch of the Amalgamated Union, has been dismissed from the employ of the Philadelphia and Reading Railroad. A few days ago four of the puddlers with whom the Phoenix Iron Company have had their recent difficulties brought suit against the latter before S. D. Hunter, justice of the peace, for the recovery of their wages. The men were James Gallagher, John McAdams, Thomas McAnany and Michael Kennedy. Only one case was heard, as it was shown from the Phoenix Iron Company's books that Gallagher owed a considerable amount of back rent during the hard times commencing in 1874, which they had never exacted, as they say, out of feelings of humanity to his family. The magistrate rendered a verdict in favor of the company of \$63.68. The other cases were not heard. To permanently settle the differences which have existed between the Phoenix Iron Company and some of their puddlers and heaters, the former have issued a paper to be circulated among the puddlers and heaters, exacting from them an affidavit, the principal points of which are that they do not belong to any union or other association that in any way attempts to control their mode of doing business.

The workmen of Essex County, N. J., are taking active steps to secure the material modification of the conspiracy law of that State, so that it will not prevent trades unionists from combining in their own interests. They have agreed upon the draft of a bill to be presented to the Legislature, which, after providing for the punishment of persons who commit any crime, or cheat or defraud any person of any property, or for the perversion or obstruction of public justice, closes as follows: "But no agreement to commit any crime other than murder, manslaughter, arson, burglary or robbery shall be deemed a conspiracy, unless some act in execution of such agreement be done to effect the object thereof by one or more of the parties to such an agreement." The bill, as amended, also provides that the concealing or spreading of any contagious disease by two or more persons shall be deemed a conspiracy.

The stove plate molders' strike at Pittsburgh is at an end. Their demand for an increase of 10 per cent. was, after a two weeks' strike, compromised for an increase of 5 per cent. A Pittsburgh stove manufacturer says that Pittsburgh was paying as much before the strike as any other city; that it will take the molders about eight months, at the increased rates, to gain what they lost by the strike, and before that time wages may be reduced. Manufacturers here cannot afford to pay more than they are now paying and expect to compete with other cities.

There is nothing new in the status of the strike now in progress at the Pittsburgh Bessemer Steel Works. The converting mill was running with a small complement of men, but as yet no arrangements looking toward a settlement had been broached. Everything was quiet among the strikers, and no fears were entertained of any trouble. The men are inflexible in their determination to stay out.

The Pittsburgh papers report signs of trouble in the wire mill of the Oliver Wire Co. The employees state that the workmen in the mill organized a lodge of Knights of Labor and joined the Amalgamated Association of Iron and Steel Workers. It is said the proprietors objected to their men forming such an organization, and within the past few days those who took the lead in forming the lodge have been discharged, for no other reason, it is alleged, than that they were the leaders in this movement. The men will hold a meeting in a few days to take action in the matter. John Kelly, one of the vice-presidents of the Amalgamated Association, says that he will attend the meeting of the workmen and hear their story, and afterward he will go to the employers and consult with them. If he finds the men are in the right, he says, he will ask for the discharged men to be restored to their former positions, and if they are in the wrong, then the proprietors will be sustained by the association. The statement of the workmen can scarcely be correct. The workmen in the mills of Oliver Bros. & Phillips are members of the Amalgamated, and they would hardly object to the workmen in their wire mills being members.

Week before last Messrs. W. W. Wharton and L. W. McConnell, the butchers who supply the miners with meat, advanced their price two cents per pound. This was regarded as entirely unjustifiable by their customers, and on Monday, when Mr. McConnell went to the Ormsby Mine on his usual weekly round, he was met by the entire female population of that village, who very plainly informed him that unless he reduced his prices to the former rates he could sell no more meat there. This he refused to do, and was compelled to return home without having sold a pound of meat. This is somewhat out of the usual order of strikes, and the result is awaited with considerable interest.

—Mercer (Pa.) Dispatch.
The recent ripple of excitement at the Pullman Car Shops, at Pullman, Ill., has almost subsided. Two hundred cabinet makers and tin and sheet-iron workers who quit work were paid off and came to the city. They held meetings and decided not to return unless the company acceded to their terms. Their places have already been provided for at the works and business will continue as usual.

If a piece of iron appears to have an unsound weld, or if it has a crack apparent upon its surface, and it is desired to know how deep it penetrates, heat the part to be tested to a red heat and pour a fine stream of water on the faulty spot, but mainly on one side of it, and the iron on that side will lose its redness more rapidly than the other side, and plainly indicate how deeply the defect extends.

Blast Furnace Gossip.

There is just now a good deal of activity in furnace construction and improvement in the West. Witherow & Gordon, of Pittsburgh, have just concluded negotiations for providing A, B and C Furnaces of the Edgar Thomson plant with Whitwell stoves, which are to be put up within ninety days. They have also closed a contract for the remodeling of Isabella Furnace No. 2 and supporting it with three Whitwell stoves, 21 x 70 feet. The No. 1 Furnace of the new plant of the Cleveland Rolling Mill Company is nearly completed and will go in blast in May or June. It is said to be an excellent furnace, well equipped in all respects, and is expected to make 200 tons of iron per day. Mr. E. A. Hitchcock, President of the St. Louis Ore and Steel Company, is in negotiation for the remodeling of the three furnaces of the late Vulcan Company; also the large Jupiter Furnace at St. Louis. We understand they will all be provided with Whitwell stoves, and it is expected that the plants will be worth \$1,000,000 more than now, when Mr. Hitchcock's plans are carried out. It is the intention of the management that the Vulcan shall be able to produce steel rails as cheaply as any plant in the United States. The four furnaces named will have a capacity of 3000 tons of Bessemer pig per week. In the South the principal development seems to be in the Birmingham district of Alabama. Within nine months it is expected this district will be producing 600 tons of iron a day, or 18,000 tons per month. The No. 1 furnace of the Sloss Furnace Co. will be completed in a few weeks. It is a 17 x 70-foot stack, supported by three Whitwell stoves, each 18 x 60 feet. They have just closed a contract with Witherow & Gordon for the erection of No. 2 furnace complete. It will be 17 x 70 feet with three Whitwell stoves, 18 x 70 feet. The new furnace plant of W. H. Woodward, of Wheeling, W. Va., is now under contract, and is to be supplemented with a nail mill. The furnace is 17 x 75 feet, and will have three Whitwells, 18 x 70 feet, besides all modern improvements. The Alice Furnace owners are in negotiation for the erection of their No. 2 furnace.

It does not appear to be generally known that the value of the mechanical equivalent of heat has within a few years been corrected. It is generally referred to by mechanical writers as 772 foot pounds. Doctor Joule repeated his famous experiments in 1876, nearly six years ago, with extraordinary precautions, and the mean result of sixty experiments gave 774.1 foot pounds, with a possible error of 1-400, on account of the "thermometric scale error." This value should be used in all calculations relating to the value of heat as a motive power.

The exports of merchandise from New York to San Salvador during the year 1881, as shown by a statement from Jacob Baiz, Consul General of that Republic, comprised 21,109 packages, valued at \$402,315. Among the largest items are machinery to the value of \$38,407, and hardware valued at \$14,312. Among other items are wire fencing, plows, iron pipe and railroad materials. The trade of the Central American Republics is worth encouraging.

Special Notices.

For Sale.

Iron Shapers, 7 1/2 inch stroke, adjustable while in motion. Price, \$250 net, f. o. b. Send for photo. Address
NIAGARA STAMPING AND TOOL CO.,
Buffalo, N. Y.

For Sale--Boilers.

Two Corliss Drop Flue Boilers, each 26 feet long, 4 feet diameter; flues 14 inch diameter. Have been running at a pressure of 50 pounds. Price, \$200 each. Can be seen at 234 West 29th Street, New York City.

Car Works for Sale.

Present output about five cars daily. Either a personal interview, or full particulars may be obtained, by addressing the owner, X. Y. Z.,
Office of The Iron Age, 83 Reade St., New York.

For Sale.

Four Column Drills, three Lathes, 42 x 13 1/2 foot Planer, 5 1/2 foot Boring Mill, small Shaper, 3 to 300 H. P. Engines and Boilers. Wood-working Machinery, Pulleys, &c.
A. G. BROOKS & WINEBRENER,
261 North 3d St., Philadelphia.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,
Issue Licenses to use the Process for the Manufacture of Iron and Steel
In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces. The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of The Iron Age of Oct. 25th, 1877.

DESIGNING

of Rolls for every kind of shape, and iron or steel; also trains and other mill work; furnishes quick and on reasonable terms.

GUSTAVE LINCKE,

Pittsburgh, Pa.

WANTED.—A young man who has had two or three years' experience in the hardware business, to fill the position of City Order and Delivery Clerk. Address
P. O. BOX 1462,
New York City.

WANTED.—A position by a thorough "hardware man," who has been a purchaser, salesman, traveler, bookkeeper and secretary—first-class in all—with best references. Known all over the United States. Address
HARDWARE,
56 East 131st St., New York.

Special Notices.

Wanted.

A thoroughly competent and experienced Mining Engineer as Superintendent of iron ore mining. Satisfactory references required. None others need apply. Address
S. B. COLLINS,
137 South Fifth St., Philadelphia, Pa.

Wanted.

A thoroughly competent, experienced man, one that understands the mixture of iron and the management of men, as Foreman of the old established Car Wheel Works in New York State. None others need apply. Compensation liberal. Address
CAR WHEELS,
Office of The Iron Age, 83 Reade St., New York.

Wanted.

A Partner in a Foundry and Machine Business, established in 1824. For particulars, inquire of
I. H. COLLIER,
Poughkeepsie, N. Y.

Wanted.

Power Shear for cutting up bar iron scrap, large and small. Also small Power Punching Press. Also a good Iron Planer. Give weights, dimensions and prices.

Box 1012, Post Office, New York.

Wanted--Partner.

In an established business as Manufacturers' Agents, representing first-class houses in Hardware specialties. Must be a first-class Traveling Salesman, with from \$3000 to \$5000 capital. To the right man a good opportunity will be offered. The best of references given and required. Address
PARTNER,
Office of The Iron Age, 83 Reade St., New York.

Wanted.

A second-hand Rotary or Crocodile Squeezer for Puddle Mill. Name cash price f. o. b. cars, with description. Address
PHENIX IRON CO.,
410 Walnut St., Philadelphia.

Wanted.

A second-hand Steam Engine, of standard make, and in good order, about 60 to 80 horse-power. Address, with name of maker, condition, size and price,
POST OFFICE BOX 527,
Baltimore, Md.

Wanted.

An old boiler shell, suitable to construct into a furnace cut dia.; diameter not less than 45 inches or over 47 inches; length not less than 20 feet or over 20 feet. Name cash price, f. o. b. cars. Address
HEEBNER & SONS,
Lansdale, Penn.

Nail Mill Man Wanted.

A thoroughly competent, experienced man wanted as Superintendent or Manager of a first-class Nail Mill in a Western city. None others need apply. Address, with references,
G. Letter Box D,
Cincinnati, Ohio.

Salesman Wanted.

One thoroughly familiar with Builders' Hardware and willing to travel. Apply by letter only, stating experience, references, age and salary expected, to
HOPKINS & DICKINSON MFG. CO.,
Newark, N. J.

WANTED.—A Roller for nine-inch mill and two Heaters. None but strictly temperate men need apply. References as to ability and habits required. Liberal pay guaranteed. Address
SYRACUSE IRON WORKS,
SYRACUSE, N. Y.

WANTED.—A gentleman residing in Texas desires to represent one or two manufacturers or jobbers of Builders' Hardware and Mechanics' Tools or general Hardware, on salary or commission. Has had fifteen years' experience in this line of trade, and is well posted also in cutlery, guns, ammunition, paints, oils and brushes. Good references will be given in New York City or St. Louis. Address LOCK BOX 514, Waco, Texas.

WANTED.—Position as Superintendent or Mill Manager; have had twenty-five years' practical experience; have for the last ten years been manager in iron and steel mill, merchant bar and guide mill and railroad supplies; will take position in works now running or with parties about to build new works. References given from present position. Address MANAGER, Box Z,
Office of The Iron Age, 83 Reade St., New York.

A THOROUGHLY EXPERIENCED SALESMAN, fully acquainted with Pig and Manufactured Iron trade, also practical mechanical knowledge of Pumps, Engines and Machinery, with extensive acquaintance with best trade in Middle and Western States, is open for engagement with first-class Commission or Manufacturing House, on good salary or paying commissions. Address, with name and particulars,
"EXPERIENCE," Box 60,
Office of The Iron Age, 83 Reade St., New York.

MECHANICAL DRAFTSMAN, with over five years' practical experience, desires engagement; steam engines and general machinery. Good references. Certificate from Engineering College. Address
BOX 84,
Office of The Iron Age, 83 Reade St., New York.

HARDWARE.—Wanted, a first-class manufacturing concern to represent in Chicago and the West; am thoroughly posted; big trade; good salesman; plenty of ambition. Refers to Wm. Blair & Co. and Chicago Stamping Co., my old employers.
A. GUSTORFF, Room 1,
163 Washington St., Chicago, Ill.

EXPERIENCED Engineer and Machinery Agent, with storehouse and office, not fully employed, seeks an engagement with a good house for at least a number of years as Sole Agent; the firm may represent his business represented on the Exchange in Bradford, Leeds, makers of suitable goods. Address Wm. GREENWOOD, Machinery Agent, 75 A West Gate, Bradford, Yorkshire, England.

FOR SALE.—Hardware store, located in one of the most thriving cities in Kansas. Will sell half or whole interest in the business. Reason for selling, owner cannot give his attention to it. Address
L. A. MELLE,
Kansas City, Mo.

DRILL PRESS FOR SALE.—A new Upright Power return motion, steel spindle and shaft, superior finish; weight, 60; height, 6 feet; price, \$100. Address
FEELLESS PUNCH & CO.,
115 W. Liberty St., New York.

Special Notices.

TRUSTEES' SALE OF

GEORGIA IRON WORKS PROPERTY.

In obedience to a decree of the Superior Court of Fulton County, Ga., in the case of G. J. Foreacre and Wm S. Thomson, trustees, against the Georgia Iron Works, we will sell the premises, public outcry, on WEDNESDAY, the first day of March, 1882, beginning at 10 o'clock a. m., the following property of the Georgia Iron Works, to wit: All that tract or parcel of land containing twenty-five acres, more or less, in the city of Atlanta, and in land lot eighty-two (82), of the 14th district (formerly known as the Atlanta Rolling Mill property), together with all the improvements thereon, consisting of the furnaces and ruins of a large rolling mill which was destroyed by fire, a large two-story stone foundry building, machine shop, office and dwelling-houses. Said real estate will be subdivided into lots, plats of which will be distributed on day of sale, or furnished on application in the meantime. Also all the machinery, patterns, tools, boilers, engines, scales, trucks, &c., of the Georgia Iron Works now on said premises. The terms of the sale will be cash, and as the decree provides as follows: "In making the sale the trustee, after receiving sufficient cash to pay off the liens having priority, or claiming priority, over the mortgage bonds, may receive in payment for said property the bonds secured by said mortgage as provided in said clause. Purchasers will get title upon complying with terms of sale."

This is a most valuable property for manufacturing purposes, being located on the line of the Western and Atlantic, Georgia Pacific and Cincinnati and Georgia Railroads, and has been subdivided to meet almost any demand for a manufacturing location. The attention of manufacturers, coal, lumber and stock dealers, as well as of capitalists generally, is called to this property as offering inducements for investment not elsewhere to be found in or about Atlanta.
G. J. FOREACRE,
WM. S. THOMSON,
Trustees

For Sale.

A complete stock of

BUILDERS' HARDWARE

and

AGRICULTURAL IMPLEMENTS.

situated in the growing city of BRIDGEPORT,

CONN. Clean stock, good trade, good location.

On account of poor health will be sold on easy terms. Address communications to

SARGENT & CO.,

New Haven, Conn., or

SARGENT & CO.,

New-York, N. Y.

For Sale.

A Valuable Iron Property,

KNOWN AS THE

POMEROY IRON WORKS,

Located at the junction of the Housatonic and Boston and Albany Railroads, in West Stockbridge, Mass. Tracks from each road into the furnace yard. This is the only Anthracite Furnace in New England. Product finds sale to the local trade; make about 800 tons per year. Reputation of the Iron first-class. The quality of the ores of the vicinity second to none. Daily shipments are made from the town to the Hudson River Furnaces at Troy and Hudson. Furnace fully equipped with Tools. A small outlay will put the Furnace in blast. The Ore Rights and Lime Quarry (the latter on the premises), with the Tools, 48 acres of Land, Tenant Houses and Barns will be included in the sale. For terms apply to
WM. TURNBULL,
Trustee of the late Theo. Pomeroys Estate,
57 and 59 West 34th St., New York City.

For further particulars, address or call on
W. M. KNEFF,
On the premises.

LARGE ENGINE LATHES FOR SALE.

One Lathe, 12 ft. bed, 24 in. swing, screw cutting, triple gear, compound rest, with cross-feed.
One Lathe, 20 ft. bed, 55 in. swing, back gear, compound rest, cross and angular feed.
One Lathe, 10 ft. bed, 50 in. swing, back geared. These Tools are in use, and can be seen at our factory.
THE STILES & PARKER PRESS CO.,
Middletown, Conn.

J. SEIDEL,

Commission Merchant,

Box 662, Habana, Cuba.

Will be happy to accept the representation of first-class houses manufacturing hardware.

Reference:

COLLINS & CO., 112 Water Street, New York.

THE NEW ENGLAND

Manufacturers' & Mechanics' Institute will hold their Second Annual Exhibition at Boston, in their specially constructed Exhibition Building, the largest in the United States, during SEPTEMBER AND OCTOBER, 1882.

Exhibitors invited from the whole world. Blank forms of applications for space sent upon application to
JOHN F. WOOD, Treasurer,
38 Hawley Street, Boston, Mass.

A Rare Chance for a Manufacturer. To lease for a term of years, at Milton-on-the-Hudson, a good Water-lower, with Buildings, which have been used as a Foundry and Machine Shop very successfully. Five minutes from the steamboat landing. Address
JOHN B. BALL,
Milton, Ulster Co., N. Y., or
HENRY DICKINSON,
243 Broadway, New York.

Special Notices.

For Sale.

The Little Schuylkill Rolling Mill,

at Milldale, Schuylkill County, Pa., near Port Clinton, on the line of the Philadelphia and Reading Railroad, consisting of a Merchant Bar Mill in complete running order, with a splendid water power sufficient to run the mill two-thirds of the year. Engines, Boilers, Foundry and Machine Shop, with Lathes for turning rolls, and all other appurtenances necessary to commence operation at once. Together with dwellings, stables and large tract of land, to be sold low if applied for soon. For further particulars address or apply to
J. O. RICHARDSON,
No. 232 Dock Street, Philadelphia.

Bolt and Nut Machinery, &c., for Sale.

One-Header Lewis Oliver & Phillips, second-hand.
Two-Header Burdick Forged Headers, second-hand.
Two-Header Lowell Forged Headers, second-hand.
One Cold Upsetter or Header, Chapin make, second-hand. Will head 6-in. long by 3/4 open die.
Two Key-Seal Cutters, most improved style, second-hand.
One Double-Punch and Shears, Allstatter No. 7, second-hand.
One Thoma & De Haven Drill, second-hand.
One Cold Chisel Cutter, Smith make, little used. Also our full line of National Machinery Co.'s manufactures: Hot-pressed and Hot-forged Nut Machines; Bolt Cutters, National Head, 8 sizes; Double-Bolt Cutters, Tappers, Headers, Washers, Rivet, Track Bolt, Pointers, Burrs, and full outfit for Bolt and Nut manufacturers. Address NATIONAL MACHINERY CO., Cleveland, Ohio, the only Specialists in the United States.

DESIRABLE MANUFACTURING SITE

For Sale or Rent.

Being the extensive property formerly occupied by the
BUFFALO IRON AND NAIL WORKS AT BLACK ROCK, IN THIS CITY.

The buildings cover over three acres, and are of brick and wood, substantially constructed, and with slate roofs. They could easily be changed, if necessary, to suit almost any kind of business. Water and railroad communication to all parts of the country. Maps of the property, with full description, sent on application.
P. P. PRATT or F. L. PRATT,
Buffalo, N. Y.

Press for Sale.

New No. 7 Open Back Trimming Press, made by Farrell Foundry and Machinery Co. For price, dimensions, &c., address
BEECHER & PECK,
Lock Box 122, New Haven, Conn.

For Sale.

Palo Alto Rolling Mills,

Near Pottsville, Pa.,

On the Main Line of the Pottsville and Reading Railroad.

These mills are in good repair, and can be started in two days' time.
Rolls for T-Rails 12 to 70 lbs. per yard, and for Street Rails 18 to 70 lbs. per yard.
Guide Mill Train for Merchant Iron 1/4 to 1 inch.
Rolls for Merchant Bar, round and square, up to 4 1/2 inches.
Number of Puddling Furnaces in both mills, 30; Heating Furnaces, 9, all with boilers attached.
Also, Foundry, Machine Shop, Blacksmith Shop, Iron House, Roll House, Carpenter and Pattern Shops, Stables, Handsome Dwelling for superintendent, 11 Tenement Houses, a Brick Office, and ample grounds for stock and cinder.
For further particulars address
Messrs. LEE & McCAMANT, Extrs.,
Pottsville, Pa.

THOS. F. WRIGHT, 1804 Race St., Philadelphia, Pa.
HUGH W. ADAMS, 56 Pine St., New York.

For Sale.

A Valuable Charcoal Iron Property,

Located on the James River, 16 miles south of the Chesapeake, at Ohio R. R. at Williamson, known as the SALISBURY FURNACE, on the Richmond & Allegheny Railroad, at which place there is a Railroad Station, a Post office and Telegraph Station. The property is composed of 300 acres of land. At the furnace there are five family houses, a grist mill and a store house ready supplied with goods for the work hands and the country round about, also a stable, blacksmith and wagon shop. The ore is taken from a tunnel in the mountain in tramway cars and dumped into a flume which runs down to the foot of the mountain. Water is brought along the side of the mountain in a flume to where the ore is dumped, and before it reaches the foot of the mountain the ore is thoroughly washed. The furnace will go out of blast about the first of February. It has made in this blast about 200 tons of first-class car wheel iron. The property will be sold on easy terms.
Apply to
EUGENE KELLY,
45 Exchange Place, New York.

For Sale.

One Beam Engine, 25 x 48, in first-class condition in every respect, patent cut-off, Shive governor, exhaust pipe heater, 18-foot fly wheel, &c., all complete. Price \$1200; easy terms.
SHIMER & CO.,
250 South 3d St., Philadelphia.

FOR SALE.—MINE CARS.

Fifty Mine Cars for 3 ft. 6 in. track; are end dumps of most approved pattern, strongly built, and fitted with the Thomas self-oiling chilled wheel, capacity about 2 1/2 tons. Will be sold cheap. Address
JAMES E. THOMAS,
Newark, Ohio.

For Sale.

Two hundred tons clean new Scale from forge rolls and squeezer, where scrap and muck bar is made. Address
COBB'S IRON AND NAIL CO.,
Aurora, Indiana.

For Sale.

A Hardware Manufactory, at Westville, Conn., consisting of Foundry, Machine Shop, Stovehouse and other buildings; also Water Power, Engine, Boiler, Patterns, Tools and Machinery used in the same. Address
THE BLAKE HARDWARE CO.,
New Haven, Conn.

PUNCHING PRESS AND SHEAR FOR SALE.—A Roller-makers Punching Machine, 24-inch throat, punching 3/4 hole in 1/4 iron. Also a Power Shear, will shear 3/4 plate-iron 54 inches in width. Weight of each about six pounds. FEELLESS PUNCH AND SHEAR CO., 115 W. Liberty Street, New York.

Special Notices.

JOB LOT.

ELEY BROTHERS'

GENUINE BLUE CARTRIDGE CASES, Twelve Gauge.

The best paper shell in the market. For sale cheap. Supply limited.

ALFRED FIELD & CO.,

93 Chambers St., N. Y.

E. BISSELL & CO.,

Wholesale Hardware Auctioneers,

53 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and importers.

ROBERT R. HAYDOCK & CO., Auctioneers & Commission Merchants,

No. 75 Murray Street, New York,

Solicit consignments of Hardware, Cutlery, Stamped Tinware, Woodenware, House-furnishing Goods, &c., for sale by Auction. Terms and further information may be had by addressing P. O. Box 156.

Bolt, Nut and Washer Machinery For Sale.

Six 1 1/2-in. double-head Bolt Cutters with automatic stop, and powerfully geared, and particularly adapted to cutting Track Bolts or large quantities of Bolts of various sizes.
Four 3/4-in. double-head Bolt Cutters, the same as are used in all large bolt factories.
Two 4-spindle and One 6-spindle Nut Tappers.
Two No. 2 Washer Machines for making all washers 3/4 in.
One No. 1 Washer Machine for washers up to 2 in. Bolt Size.
Two Bolt Headers with latest and best improvements for all bolts to 1 in. Strongest heads and largest variety of any machine in use.
One No. 1 Nut Machine for 1 1/4 in. Nuts, hexagon or square.
Two No. 2 Nut Machines for No. 1 Nuts, and all under.
Two No. 3 Nut Machines for 1/2 in. Nuts, and all smaller; 1000 lbs. of 3/4 in. Nuts made per day.

YORK & SMITH,

Cleveland, Ohio.

For Sale.

A well-established Hardware business, Stock, Fixtures and Good Will, located in Northern New York, on the line of D. and H. C. Co. Railroad. Business of twenty years' standing. Address
HARDWARE TRADE,
Office of The Iron Age, 83 Reade St., New York.

For Sale.

Two Corliss Condensing Beam Engines,

32 in. x 72 in. cylinders. Address,
THE HARTFORD ENGINEERING CO.,
Hartford, Conn.

For Sale.

The one-story building, about 100 x 170, with two-story brick building adjoining, about 30 x 100, with water wheel and shafting; also a vacant lot, 100 x 200, adjoining with water-power privilege. Water supplied by the Cohoes Company, located in the City of Cohoes, N. Y., and occupied by A. G. Peck & Co. as an ax factory. Apply to
MORRISON & COLWELL,
Troy, N. Y.

For Sale.

Foundry and Machine Shop.

Large assortment of Patterns. Business established in 1824. For terms and full particulars apply to
C. VAN BRUNT,
121 Chambers Street, New York.

For Sale.

One 30-inch Engine, one 120-horse Locomotive Boiler; two large Pulleys, 30-inch face; a 30-inch Rubber Belt, &c. All in good order, and will be sold for less than value to make room for larger. Can be seen running at
AKRON RUBBER WORKS,
Akron, Ohio.

Presses for Sale.

Three small Power Punching Presses, in first-class order. They are set on workbench. Price \$75 each (cost \$150).
FEELLESS PUNCH AND SHEAR CO.,
115 W. Liberty St., New York.

For Sale.

From 750 to 1000 acres of coal land, with two 5-foot coal seams and all the minerals of Eastern Ohio and Western Pennsylvania; has good iron or steel manufacturing site, with railroad and Ohio River frontage. Inquire for printed circular of JNO. C. COUCH, Real Estate Agent,
129 Fifth Avenue, Pittsburgh.

FOR SALE LOW.—ENGINE.

A Vertical High-Pressure Steam Engine, complete. Cylinder, 24 in. by 48 in. Built by A. J. Sweeney & Son. Can be seen in daily use at our nail factory.
LA BELLE IRON WORKS,
Wheeling, West Va.

For Sale.

Stock of Hardware in Columbus, Ohio. Clean stock, good trade, good location. On account of failing health will be sold on advantageous terms and payments easy; will not be exchanged for real estate. Address
Z. Y. CLARK,
Columbus, Ohio.

Blast Furnace For Sale.

One of the very best properties in the state of Pennsylvania, including farms of 125 acres, considerable portion of which is Ore Land. Capacity, 275 tons Pig Iron per week. For full particulars apply to
J. O. RICHARDSON,
No. 232 Dock St., Philadelphia.

Special Notices.**For Sale.**

THAT VALUABLE

FURNACE PROPERTY AND PLANT,

situated in Tuscarawas County, Ohio, on the P. & C. St. L. Railroad, and the Ohio State Canal, known as THE GLASGOW IRON WORKS, consisting of two Blast Furnaces, 72 feet high, erected in 1874; two Blowing Engines, eight Boilers, 50 feet long; four Hot Blast Ovens, two Furnace Hoists, with two pairs "Crane Bros." Hoisting Engines, and all modern furnace appliances and plant. Also Locomotive Cars, about 200 feet of 5-inch cast iron pipes, as well as Workmen's Houses, Offices, &c., &c. Also about 100 acres of Ore, Timber and Farm Lands, containing some deposits of the best of the celebrated Blackband Ore. There are four seams of Coal in the property, some suitable for furnace use; also Fire Clay of excellent quality, all already opened up by drift mines. Offers for the above will be received by

JOHN FREW,

Port Washington, Tuscarawas County, Ohio.

For Sale.

A Manufactory complete; orders constantly ahead; thoroughly established; goods having the highest reputation and staple; business can be increased; net profits, \$15,000. Price, \$25,000. To be sold on account of advanced age. Liberal terms to a satisfactory purchaser.

W. M. BURDICK,

150 Nassau Street, N. Y. City.

For Sale.

Hardware Stock and Business of twenty years' standing, in a live manufacturing railroad town in Ohio. Stock about \$25,000. A rare opportunity. For particulars, inquire of

T. B. RAYLAND & CO.,

Detroit, Mich.

For Sale.

A complete manufactory, with a business of over thirty years' standing, in Agricultural Tools of high reputation, well-known to the hardware and export trade in the United States. Parties wishing to invest about \$50,000 in a very substantial and reliable business, will have every opportunity to investigate this by addressing

AGRICULTURAL TOOLS,

Office of The Iron Age, 83 Reade St., New York.

For Sale.

The largest stock of New and Second-hand Engines, Boilers, and general Machinery in the West. Send for Catalogue. Hoisting Outfits for Coal Mining and other purposes a specialty.

WARREN SPRINGER,

105 to 219 South Canal St., Chicago.

For Sale.

Horizontal Engines, 18 x 30 inch, slide valve; also 16 x 24 (Howes & Phillips), with cut-off; 16 x 36 (Currier), with cut-off; 16 x 28 Upright Engine, with cut-off; one 30 H. P. Locomotive Boiler; one 4-ton "Otis" Freight Elevator; No. 5 Knowles Steam Pump. All the above guaranteed complete and in perfect order. For particulars address

BELCHER & BAGNALL,

40 Cortland St., N. Y.

For Sale.**STEEL RAILS—IN STORE.**

1000 Tons 40 lb. "Guards,"

1000 Tons 41½ lb. "Rhymney,"

with Steel Fish Plates to match the 41½ lb. Rails. Iron and Steel Rails of any section, for delivery in the United States, or f. o. b. English ports.

WM. LAWRENCE STROUD,

104 John Street, New York.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as parts of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. The works are now running, but in a very short time possession can be given. Easy terms of payment are offered to suit a purchaser of limited capital.

Offered for sale by

WM. McILVAIN & SONS,

Reading, Pa.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address

HARDWARE,

Box 366, Salina, Kansas.

FOR SALE OR TO RENT.

New, light Factory; 70,000 floor feet; 275 H. P. Corlies Engine, giving power at minimum cost.

Shafting, piping, elevator, &c., all complete and modern. Lowest insurance rates. Railroad siding and ample yard room. Immediate possession.

A large quantity of General and Special Machinery at low prices.

SHARPE RIFLE COMPANY,

Bridgeport, Conn.

For Sale.

Hardware Stock and Business. Located in one of the best towns of Northeastern Pennsylvania. Stock clean and well assorted, suited to the requirements of the trade where located. Business of 30 years' standing. For terms and full particulars apply to

JAMES S. KUHN, Towanda, Pa.

Manufacturing Property for Sale.

The Real Estate of the late Foundry and Machine Company of Taunton, Mass. Buildings consist of Foundry, Machine, Erecting and Blacksmith Shop, and covering about 60,000 square feet of ground. For particulars apply to

THE GEORGE PLACE MACHINERY AGENCY,

121 Chambers St., New York.

Special Notices.**To Railroads, Mill Owners and Contractors.****STRUCTURAL IRON WORK FOR SALE.**

Having purchased the Ironwork of the Main Centennial Building, situated in Fairmount Park, Philadelphia, we now offer the same in sections to suit purchasers. These buildings can be sold in widths varying from 100 to 160 feet, and of any height, from 40 feet down to 25 feet, and in length from 100 to 700 feet. We have eight Spiral Stairways, in all over 800 steps.

Plans showing how all parts of these buildings may be utilized in railroad depots, &c., have been prepared by Messrs. Wilson Bros. & Co., of Philadelphia, civil engineers and architects, and can be seen at the office of Mackintosh, Hemphill & Co., limited, Fort Pitt Foundry, Pittsburgh, Pa., or at the office of the company, at Centennial Building, West Philadelphia.

Wishing to dispose of the above quickly, we are prepared to offer great inducements to purchasers, both as to low price of material and promptness of delivery. Any communications addressed to the CENTENNIAL STRUCTURAL CO., care of Mackintosh, Hemphill & Co., limited, will receive prompt attention.

Copartnership Dissolution.

NOTICE is hereby given that by the death of the junior partner, Mr. Nathan Anthony, the firm of BRADFORD & ANTHONY is this day dissolved. The affairs of the firm will be settled by the undersigned, the sole surviving partner.

MARTIN L. BRADFORD,

Boston, June 12, 1881.

All communications in regard to the affairs of the late firm should be addressed to

BRADFORD & ANTHONY, Boston, Mass.

MARTIN L. BRADFORD hereby gives notice that he will continue his business under the name of "BRADFORD & ANTHONY."

The estate of the late Nathan Anthony is to be in no way interested in the future business, whether conducted under the name of Bradford & Anthony or otherwise.

All business communications should be addressed to BRADFORD & ANTHONY,

374 Washington St., Boston.

Importers, Manufacturers' Agents and Dealers in Cutlery, Fishing Tackle, Skates, &c.

See advertisement first issue each month.

IRON RAILS. STEEL RAILS.

THE SPRINGFIELD IRON COMPANY

are open for orders for IRON AND STEEL

RAILS for prompt delivery.

Apply to the Company at Springfield, Illinois,

or to

JAMES JOHNSTON, Agent,

10 Pine Street, New York.

AN OHIO MANUFACTURER

In Brass Goods for steam purposes who has a traveler on the road covering Ohio, Indiana, Michigan, Illinois and Missouri, would be glad to represent some other manufacturer for sale of special goods sold to engine builders or the hardware trade. Address

W. BARNETT,

Mansfield, Ohio.

Copartnership Notice.

Mr. H. Bielefeldt has been admitted a partner in our business from this date.

HAMBURG AND NEW YORK, Jan. 1, 1882.

HAMMACHER & DELIUS.

NOTICE.**TO THE HARDWARE TRADE,**

Retail and Wholesale.

Before buying, send to me for quotations.

Will give special figures lower than market

rates on a large line of Shelf Hardware and

Tinware.

A. W. WHEELER,

141 Lake St., Chicago.

ASH HANDLES

for Forks, Shovels and Spades in large quantities

and of good quality, for home trade or export.

ALLEN & NIXON,

52 Maiden Lane, New York.

Hardware, Cutlery and Machinery

To Exchange for a good farm, U. S. A. or Can-

ada. Address, with full particulars,

ENGLAND,

Care of The Ironmonger,

44a Cannon St., London, E. C., England.

FORGINGS.

A practical man, having some capital to invest, would like to hear from parties who are desirous of establishing the Forging Business in their neighborhood. State location, chances for business and inducements that can be offered to

W. H. N. & CO.,

Office of The Iron Age, 83 Reade St., New York.

A REWARD OF \$100

Is offered for the most useful and merchantable article to be made from Cotton Tie Band Scrap Iron. Right reserved to reject any or all samples. The one accepted will be remitted for in cash.

Address

J. S. BROWN,

Galveston, Texas.

Wholesale Hardware.

Parties wishing to invest in Wholesale Hardware

business in a Western city, please address

A. B. K. & Co.,

Office of The Iron Age, 83 Reade St., New York.

Special inducements offered.

WANTED.—A young man wants a situation as

Clerk in a first-class Hardware house. Ten

years' experience in the general hardware business. Best of references. Address P. O. BOX 95,

Lykens, Pa.

Trade Report.**BRITISH IRON AND METAL MARKETS.**

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Feb. 22, 1882.

Scotch Pig.—Prices have been irregular during the week, fluctuating in both directions, but the market closes steady, with a fair business doing. There is a strong probability that the arrangement to limit production will be continued till September. As compared with last week, prices are 6d. lower, with the exception of Carnbroe, which is 1/ lower, and Glengarnock, which remains unchanged. The following are to-day's quotations for No. 1:

Gartsherrie, alongside, Glasgow	58/6
Coltness	58/6
Summerlee	58/6
Langloan	59/6
Carnbroe	53/6
Glengarnock	53/6
Eglington	49/6

Lighterage from Ardrossan to Glasgow is 2/ @ 2/6 per ton.

Cleveland Pig.—The demand continues to increase, and transactions have been large. Prices are steady at unchanged figures. We quote as follows, f. o. b. shipping ports:

Middlesbrough No. 1 Foundry	45/
No. 2	45/
No. 3	45/6
No. 4 Forge	46/0

West Coast Hematites.—A large business has been done under an improved demand. Prices are weak. We quote mixtures Nos. 1, 2 and 3, 60/ @ 62/ f. o. b. shipping ports.

Blooms.—The market is dull, with small demand. Prices are steady. We quote: 7" x 7", £5. 12/6.

Manufactured Iron.—The advance in wages has stiffened quotations materially, and all kinds of Finished Iron are firm. We quote:

Staffordshire Marked Bars	7 10 0 @ 8 0 0
Medium	7 2 6 @ 7 10 0
Common	6 15 0 @ 7 0 0
Hoops, 30 W.G. & over, Best	9 0 0 @ 11 0 0
Med.	7 15 0 @ 8 10 0
Com.	7 5 0 @ 8 0 0
Cotton Ties (nominal)	8 10 0 @ 8 10 0
Sheets, 30 W.G. & under, Ref.	10 0 0 @ 13 0 0
Com.	8 0 0 @ 9 0 0
Welsh Bars	6 0 0 @ 6 0 0

Steel Rails.—The market is quiet, with a fair business doing. Ordinary sections are quoted, nominally, £6. 5/ @ £6. 10/.

Iron Rails.—There is no change to report in the state of the market, which rules dull, with small demand. Welsh, 30 lb and upward, are quoted, nominally, £5. 10/ f. o. b. shipping port.

Old Rails.—The offerings are moderate and sales small. Prices are steady. We quote, c. i. f. New York, Old Tees, £4. 5/ and Old D. H.'s, £4. 17/6.

Scrap.—The market remains without feature to note. The offerings and sales are both light. We quote Heavy Wrought, c. i. f. New York, £4. 5/ @ £4. 10/.

Copper.—The market is quiet, with fair demand. Prices are weaker and lower. Today's quotations for Best Selected showing a decline to £70 @ £71.

Tin.—The downward tendency of values received a check during the week, and prices advanced, but fell off again toward the close, and are now weaker. We quote Straits Ingots, spot, £113, and futures, £115.

Tin Plates.—The market is quiet, with a fair business doing. We quote, nominally: Tin Plates, 10 x 14, 1st qual. Charcoal, 23/ @ 25/; " " " " 21/ @ 22/; " " " " 17/6 @ 18/.

Spelter.—A moderate business has been done under a steady demand. Ordinary is quoted, at shipping ports, nominally, £17.

Lead.—There is a marked improvement in the demand, and prices are steady. We quote English Pig, common, £14. 10/.

Freights.—Are lower. Steam freights from Glasgow to New York are quoted, 15/ @ 17/6; ditto from Liverpool to New York, 15/ @ 17/6, and Liverpool to Philadelphia, 17/6 @ 20/.

FINANCIAL.

Office of THE IRON AGE, 83 READE ST., NEW YORK.
WEDNESDAY EVENING, Feb. 22, 1882.

The week under review has been marked by no special feature, aside from the continued shrinkage of values in some of the leading staples and decline on the Stock Exchange, with a partial recovery toward the close. The threatened panic at Chicago was averted, or at least deferred, though not until numerous failures occurred among leading speculators, in consequence of the depression in commercial circles. It was anticipated, as a natural result, that a heavy decline in prices would stimulate exports on a considerable scale and a return to a more nominal condition of trade be rapidly hastened. Expectations in this regard have hardly been realized, for where exporters entered the market the decline was checked. The fluctuations, however, were extreme, induced by the generally unsettled situation and uncertainties of the future. As remarked on the Produce Exchange, "while the foreign markets are quite generally showing a drift in the direction of lower prices for grain, our market, stimulated by speculative influences emanating at the West, is higher, and exporters are once more practically shut out."

On the Stock Exchange the market closed with unusual excitement in the market for speculative shares, the chief feature being

the sharp decline in Louisville and Nashville stock, which since last January sold above par, but has fallen about 20 per cent. within a few days. On Tuesday it closed at 71½, and the general list suffered in sympathy. Memphis and Charleston opened 2 per cent. lower at 66, broke to 50, rallied to 57½ and closed at 55½. The decline in other stocks ranged from 1 to 7 per cent., the latter in Richmond and Danville Terminal, and Norfolk and Western preferred. The week previously had been irregular, varied at the commencement by an attack on Jersey Central, based upon proceedings in the New Jersey Legislature supposed to be in the interest of the company, and intended to defeat the attempts of the Baltimore and Ohio Railroad to get control of the stock. Denver and Rio Grande, and Hannibal and St. Joseph also suffered from bear raids. On Friday, Western Union declined under a pressure to sell, affecting unfavorably other Good stocks. The strongest stocks were the Vanderbilt stocks, Illinois Central and St. Paul. On Saturday the market was strong and active, closing at about the best figures for several of the leading stocks. The contest for the control of Central New Jersey excited much interest. On Monday the market as a whole declined, influenced chiefly by Louisville and Nashville, which broke from 86½ to 79½ on a variety of rumors, none of which are as yet absolutely confirmed, and the developments of to-morrow (Thursday) may have much significance. It was remarked that both Monday and Tuesday were noteworthy days in the Exchange, on account of the rapid decline in the price of nearly every active security.

On Monday the leading drawers of sterling exchange reduced their posted rate for demand bills to \$4.90, but on Tuesday, on account of the absence of commercial bills and a moderate demand for remittance, rates were stiffened to \$4.85½ @ \$4.90½. There is not such a free export movement of the staples as wanted. Time loans on good stock collateral rule firm at 6%, and little commercial paper passes at less than the legal rates.

The exports (exclusive of specie) from the port of New York for the week ending 21st inst. show an increase of about \$800,000, as compared with the figures of the previous week, amounting to \$6,611,935. For the week ended February 21, 1881, the exports were \$6,718,609. The total exports (exclusive of specie) since January 1 are \$45,288,056, against \$49,944,044 for the same period last year.

To-day being Washington's Birthday and a legal holiday, all the commercial and financial exchanges are closed.

Government bonds were steady to strong, closing at the following quotations:

	Bid.	Asked.
U. S. 4½'s 1891 registered	113½	113½
U. S. 4½'s 1891 coupon	114½	114½
U. S. 4's 1907 registered	117½	117½
U. S. 4's 1907 coupon	117½	117½
U. S. Currency 68 1895	120	120
U. S. Currency 68 1897	127	127
U. S. Currency 68 1900	128	128
U. S. Currency 68 1902	129	129
Sixes continued	107¾	107¾
Fives continued	102	102½

The bank return for the week shows a loss of \$2,978,950 in reserve, which now stands at 1,072,225, against \$3,807,275 at this time last year, and \$7,492,450 for the corresponding date in 1880.

The importations of specie and bullion at this port during the week ending February 17th were \$23,156 consisting of \$7287 in gold, and \$20,869 in silver, as against a total of \$314,432 for the week ending February 19 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—	1881.	1882.
Gold	\$291,062	\$4,708,087	\$4,708,087
Silver	215,832	510,853	510,853
Total	\$506,894	\$5,218,940	\$5,218,940
	Since August 1—	1881-82.	1880-81.
Gold	\$24,837,348	\$78,987,055	\$78,987,055
Silver	1,259,007	2,982,904	2,982,904
Total	\$26,096,355	\$81,969,959	\$81,969,959

The following is an analysis of the bank totals of this week compared with that of last week:

	Feb. 11.	Feb. 18.	Comparison.
Loans	\$397,013,500	\$398,550,500	Inc. \$1,537,000
Specie	\$3,209,500	\$3,279,500	Inc. 70,000
Legal t'd's	18,434,500	18,085,000	Dec. 349,500
Total reserve	81,214,000	77,544,000	Dec. 3,670,000
Deposits	310,651,300	305,887,100	Dec. 4,764,200
Reserve re-			
quired	77,662,825	76,471,775	Dec. 1,191,050
Surplus	4,051,175	1,072,225	Dec. 2,978,950
Circulation	9,940,100	10,075,000	Dec. 134,900

MINING STOCKS.

The following were the closing quotations for mining stocks:

	Bid.	Asked.
American Flag	15	15
Amie	23	25
Alice	2.80	2.85
Alta Mont.	1.80	1.85
Alouette	8.75	8.75
Bechtel	45	45
Belle Isle	10	10
Bodie	3.60	3.60
Buckeye	4	4
Bulwer	2.25	2.30
Basick	5.25	5.25
Bull Dog	95	95
Bonanza C.	5	5
Boilder	8	8
Boston C.	30	30
Big Pittsburgh	97	97
Bradshaw	40	41
Beattie	1.45	1.5

22

STANLEY WORKS DISCOVERY SERIES.

[illegible]

*Olive Bronzed, Light Inside Blind Butts, Nos. 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580, 1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632, 1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658, 1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710, 1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762, 1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788, 1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814, 1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866, 1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892, 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918, 1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944, 1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970, 1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048, 2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 207

	Washers, No. 1336.	45
244.	*Tinned Strap and T Hinges, Nos. 1338, 1340.	40
		40
245.	*Tinned Hinge Haps, No. 1341.	40
	*Crate Hinges, No. 1342.	40
246.	" Haps, Nos. 1343, 1344.	40
247.	" Light Inside Blind Batts, No. 1345.	40
248.	" Narrow Batts, No. 1354.	40
249.	" Narrow Batts, No. 1355.	40
250.	" Screws, No. 1356.	40
251.	Scovell's Brass Spring Hinges.	40
252.	" Wrought Iron Hinges, with Brass Springs.	40
253.	" Spring.	40
254.	Scovell's Wrought Iron Elbow Case Hinges.	40
255.	Brass Springs.	40

IRON.

The scheme of the proposed New York Iron Exchange is in good hands. Mr. E. S. Wheeler, chairman of the preliminary meeting held last week, and to whom was committed the duty of naming the committee of nine to consider the subject and report a scheme of organization, has announced that the committee consists of the following firms: Naylor & Co., Thomas Iron Company, Cooper, Hewitt & Co., the Port Henry Iron Ore Company, the Albany and Rensselaer Iron and Steel Company, Thomas J. Pope & Brothers, J. B. & J. M. Cornell, the National Tube Works Company and W. H. Wallace & Co. These are all representative houses in their several lines, and will undoubtedly reflect in any report they may agree upon the views of those for whom the question of an Iron Exchange has interest.

American Pig.—The condition of the Iron market is difficult to explain, for while it is freely admitted that there is no abatement of consumption, there is little inquiry, and the transactions that have come to our notice during the week have been only in small lots to tide over present needs. There is no sign of weakness, however, and no pressure to sell. Foundry No. 1 X is quoted firm at \$26.50 @ \$27; Foundry No. 2 X, \$25, and Gray Forge, \$24.

Scotch Pig.—The demand for Scotch Iron is light, and prices of some brands are slightly more in buyers' favor than they were last week. The amount of business transpiring is small and of a retail nature. We quote: E. Lion, \$24 @ \$24.50; Carnbroe, \$25 @ \$5.50; Oldness, \$27.50; Glengarnock, \$25.50 @ \$26, and Gartsherrie, \$26 @ \$27.

Rails.—The condition of this branch of the Iron trade is unchanged. No new business has come to our notice during the week. We quote: Steel, at mill, \$57 @ \$60, and Iron Rails, \$48 @ \$50.

Old Rails.—The demand is very light, and the tone of the market the opposite of vigorous. We have not heard of any transaction worth naming since our last writing, and quote T's \$30, and D. H. \$32.

Scrap.—No. 1 Wrought, to arrive, quoted \$31.50 @ \$32. Yard Scrap is difficult to find at present, and we omit quotation. No new business is reported.

METALS.

Copper.—The market has been quiet, but if anything, a little stronger, about 200,000 lb Lake selling from the hands of outside parties at 19½. This figure continues to be offered, while the companies adhere, of course nominally, to their old figure of 20 asked; they, in fact, do not wish to name any price below this, in consideration of previous important sales effected by them. There is no demand for futures. "London Feb. 4.—The Copper market has this week been very unsettled, and business in China Bars has been transacted at variable rates. At the beginning of the week confidence was greatly shaken, and prices were considerably reduced compared with those ruling at the close of last week. There were several adverse features to which the panic among holders could be attributed—not only those which affect the whole trade, and to which reference has been made in our leading remarks, but there were also other unfavorable events which also tended to weaken the particular market, such, for instance, as a large increase being made, according to statistics, in the total visible stock, somewhat diminished deliveries for last month, and the charters from Chili for the last half of January being rather above the average, amounting to 1800 tons, and 450 tons furnace material for England, and 700 bars either for home or for the Continent. There is a larger increase of 33 tons in the total stock, against 50,593 tons stood at 53,967 tons, against 50,593 tons on Dec. 31 last. Manufacturers have made no change in prices. They quote: Cu. Bars, 31½ @ 32½; Bransiers, 30½ @ 36½; Circles, 33½ @ 36½; Sheathing, 25½, a Bolt Copper, 30½; Segment Sheets, 33½; Fire-box ditto, 30½. We receive per cable from London the following dispatch: "The market is quiet with a fair demand. Prices are weaker and lower, to-day's quotations for Best Selected showing a decline to £70 @ 71½."

PRODUCTION OF COPPER IN RUSSIA.

	Pounds.	Net to
1874	108,287	3,600
1875	125,459	4,400
1876	236,459	4,800
1877	314,931	3,800
1878	214,884	3,800
1879	19,468	3,400

Tin.—Without much doing the market here has remained firm at the following quotations for large lines: Straits, 25½, and 25½ @ futures; Australian and Biliton 25½; Lamb & Flag, 25½, and Banca 25½ asked. Yesterday Straits, on the spot, had advanced in London from £112 to £121 and futures were cabled £115. We received to-day the following cable telegram direct: "The downward tendency of values received a check during the week and prices advanced but fell off again toward the close and are now weaker." We quote Straits Ingot, \$21.13, and futures £115. By mail we have the following: "London, February 4. This market has kept animate, and a large business throughout the whole week has been transacted. At the early part, prices being somewhat pressed, prices gave considerably, but during the last few days a sharp rebound has been made, and trading being very spirited, prices have rallied."

to some appreciable extent. There is such a large interest existing in the maintenance of this market that operators will not allow prices to fall away very materially, and notwithstanding the high prices ruling, which do not apparently in any way unnerve operators, yet purchases are freely made, and the turnover keeps very large. Holders gain confidence from the fact that the dear prices do not interfere with consumption, which is clearly proved by the continued maintenance of deliveries, which last month are said to have amounted to 2064 tons, against 1685 tons in the previous month, 1607 tons in January, 1881, and 1857 tons in the same month of 1880. The total visible stock on the 31st ult. was estimated at 15,696 tons, against 15,675 tons on December 31, and 19,568 tons January 31, 1881. The shipments from Straits to London last month were 500 tons, from Australia 375 tons, and from Straits to America 1150 tons." Messrs. Gilliland, Wood & Co., Singapore, report the shipments from the Straits settlements to the United States as under:

	Piculs.	equal to	Tons.
1881.....	82,824	"	4,871
1880.....	144,525	"	8,501
1879.....	120,910	"	7,079
1878.....	68,731	"	4,043
1877.....	60,263	"	4,080

Tin Plates.—The market has been quiet at the ensuing quotations for large lots, ordinary brands, 48 box: Charcoal Bright, \$6.20 @ \$6.50; ditto Termes, \$5.30 @ \$5.62½; Coke Tin, \$5.25 @ \$5.40, and ditto Termes, \$5.12½ @ \$5.25. From England, yesterday, a strong market was reported, Coke at 16/ @ 17/, and Charcoal at 10/ @ 20/. "We hear to-day from there ourselves: "The market is quiet, with a fair business doing."

Lead.—Our market has been inactive and dull, and closes quiet. We quote nominally large lots, Common, \$5.15 @ \$5.20, and smaller ones sell at 5 1/4%. Refined, without anything doing, may nominally be called \$5.25 @ \$5.30. St. Louis reports by mail, Feb. 18: "Lead easier and quiet. Soft Missouri and Refined sold lightly at \$4.97 1/2 @ \$4.95, part del. (mainly at latter figure), while Hard ranged at \$4.90 @ \$4.87 1/2 del. But no buyers of Soft or Refined at \$4.95 yesterday. To-day, lower; Soft Missouri offered at \$4.90, no taker." Russian production, which in 1874 was only 325 tons, was 1496 tons in 1879. Should the rather more warlike outlook in Eastern Europe continue a little longer, Russia may again appear as a large buyer of Lead in Western Europe for Government account. We receive from London the following: "There is no

a marked improvement in the demand and prices are steady. We quote English Pig, Common, £14. 10/." Mail advices say. "London, Feb. 4.—Lead is firmer. Transactions were carried through in Spanish early in the week at £14 5/ but later on there were

We quote: Pipe, 7½¢; Sheet, 8¢; Tinned Pipe, 15¢, and Block, 35¢; all less 10% to the trade.

SPELTER and zinc.—Spelter has fallen at unaltered rates. We quote both Domestic and Silesian, \$5.80 @ \$5.90.

PRODUCTION OF SPELTER IN RUSSIA.

	Lbs.	Tons.		Lbs.	Tons.
1874.....	951,111	4,564	1877.....	282,744	5,111
1875.....	243,480	4,391	1878.....	283,193	5,007
1876.....	264,131	5,095	1879.....	264,588	4,750

"London, Feb. 4.—The market has been very quiet this week, prices ruling from £17 6 to £17. 10 for ordinaries, and £17. 12/6 @ £17. 15/ for specials. *Sheet Zinc* is steady at 7½¢.

Antimony.—We are informed that the

Sonora Company has gone out of existence and that, in the absence of American, the demand for English Antimony is all the more pressing at 15*g* for Cookson, Hallett being quoted 13½*g*. In London, consequent upon the American demand, Hallett advanced from £52 to £54, while Cookson rose to £59.

IMPORTS

*Of Hardware, Iron, Steel and Metals into
the Port of New York, for the Week ending*

Feb. 22, 1893.

Hardware.

Barbour Twine Co.
Machinery, pkgs., 65

Barbour Bros.
Machinery, box, 1
Cases, 90

Boker Hermann & Co.
Guns, cks., 2
Cases, 2

Conger P. D.
Cases, 1

Cutler Co., S. V. & B.
Cases, 1

David Collamore & Co.
Packages, 8

Davies & Co.
Packages, 4

De Castro
Machinery, one, 1

Degraw, Hyman & Co.
Chains, lengths, 9
Chains, cks., 12

Dunham Buckley & Co.
Cases, 5

Elliott & Son
Machinery, pkgs., 36

Field Alfred & Co.
Cases, 5
Packages, 33

Arville, 26

Fraser P. A. & Co.
Cases, 1

Graef Cutlery Co.
Cases, 4

Godfrey C. J.
Guns, cks., 1

Gulch (710)
Machinery, pkgs., 35

Harby C. F. & Co.
Cases, 1

Hampstead O. G. & Son
Arms, cks., 1
Hamel L. L. & Co.
(Chains, case, 1)

Martley & Graham
Guns, cks., 8

Hunt J.
Cases, 4

Packages, 5

Hunningham J. L. & Co.
Iron nail, cks., 37

Lewis Bros.
Machinery, cks., 7

Markt & Co.
Packages, 11

Mose P. F. & Co.
Flux, cks., 4

Munacho, Ping & Co.
Cases, 1

Moore J. P. & Co.
Arms, cks., 5

Nicholson Thos.
Machinery, box, 1

Rennington & Co.
Hollow-ware, cks., 4

Rothschild Bros. & Co.
Cases, 1

Scheweling, Daly & Gates,
Cases, 10

Taylor Thomas
Cases, 4

The Cheney Bigelow
Wire Works,
Machinery, bxns., 8
Cast iron checks, 2

Rollers, 2

Wells, wheels, &c., 4

Vorn Cleff & Co.
Cases, 4

Ward Asahne
Cases, 1

Ward & Hamilton Co.
Machinery, cks., 3

Wienheim, Hilger & Co.
Arms, cks., 5
Cases, 20

Witte John G. & Bro.
Cutlery, cks., 12

Order,
Cases, 26
Arms, 4
Anvils, pkgs., 118
Nails, kegs., 10
Hollow-ware, cks., 15
Beds, cks., 20
Tanks, crates, 4

Iron

Baldwin Bros. & Co.
Pipes, sets, 30
Pipes, cks., 30
Pipes, bbls., 2
Dampers, 2

Baring Bros. & Co.
Rods, pkgs., 404
Steel, tons, 300
Old rails, tons, 800
Old rails, 650

Brown Bros. & Co.
Bars, 459

Brown, Parsons & Co.
Sheets, bbls., 137

Carey & Moon
Wire, bbls., 47

Cook & Lathrop
Girders, 40

Crocker Bros.
Pig, tons, 202

Duval Bros.
Pig, tons, 106
Pittsburg, cks., 1
Tubes, 25 5

Edison, son & Co.
Pig, tons, 46, 400

Irvine B. & Co.
Pig, tons, 500

Lang W. Bailey
Bars, 137
Bunnings, 70

Lee, James & Co.
Pig, tons, 600

Lundberg & Co.
Bundles, 202

Harz, 221

Mercantile Mts. Co.
Wire rod, cks., 296
W. & cks., 21

Mason J. W. & O.
Wire rope, coils, 11

Ogden & Wallace
Bars, 100

Pierson & Co.
Wire, pkgs., 1105

Tillotson L. G. & Co.
Hollow-ware, 167
Coils, 479

Thomsn A. A. & Co.
Galv'd iron, cks., 111

Townsend Wm. C. & Co.
Pig, tons, 300

Whitney A. J.
Sheet, 167

Wheat Irons, bbls., 60

Williamson Jas. & Co.
Pig, tons, 500

Order,
Pig, tons, 1215
Fig. lot, 1
Ore, tons, 1000
Scrap, tons, 400
S. B. pig, kegs., 100, 200
H. B. pig, kegs., 100
Coiled rods, bbls., 394

Wire rods, bbls., 12
Old chains, kg., 101-
600
Barrel hoops, bbls., 4
Spiegelstein, tons, 307
Bundles, 766
Wire coils, 853
Spined hoops, coils, 317
Old chains, lot, 1
Bars, 2343
Old iron, tons, 1200
Packages, 23
Old rails, pcs., 2910
Galvanized, cks., 100
Car wheel tires, 18
Shear-iron, bbls., 200
Tubes, 6
Angle, bars, 464

Steel.

Abbott Jere. & Co.
Bundles, 5
Cases, 47

Anderson G. B.
Bundles, 48

Barnes Bros. & Co.
Bar crop ends, tons, 250
Rails, tons, 45
Old springs, lot, 1
Black Brs., 200
Bundles, 200

Blake Bros. & Co.
Rods, rings, 1300

Carey & Mfg. Co.
Coiled Hens' wire rods, 495
Wire, bbls., 275

Dodge Alfred &
Wire, cks., 10

Drexel Morgan &
Blooms, 6767

Hoe Henry
Pins, cks., 3

Knobloch & Lichtenstein,
Blooms, 2198

Moss F. & Co.
Bundles, 153
Bars, 76

Hart R.
Wire, cks., 1

Sanders Bros. & Co.
Blooms, 1111

Order,
Blooms, 2100
Surps, cks., 5
Bars, cks., 1
Bars, 23
Forgings, 56
Bundles, 237
Steel rods, tons, 100

Rail ends, tons, 490
Bands, 120
Old rails, loads, 37
Old up ing, lot, 1
Sheet steel, bbls., 20
Sheet steel, cks., 23
Steel sheet, cks., 11
Tubes, 109

Metals.

Ansbacher A. B.
Quicksilver, bottles, 100

Aleo Miguel
Leaf tin, cks., 7

Alkan Bros. & Co.
Tin plates, bxs., 106
Brin & Cook
Tin plates, bxs., 310

Baring Bros. & Co.
Hollow-ware, bbls., 240
Tin plates, bxs., 764
Rods, parsons & Co.
Tin plates, cks., 194
Brown & Co.
Per. caps, cks., 11
Punabago, bbls., 5
Cases, 1

Tin plates, bxs., 100
Chicago stamping Co.
Tin plates, bxs., 525

Dewey & Co.
Bowling ball, cks., 1
Tin, ingots, 250

Dickerson, Van Dusen &
Cases, 1
Tin plates, bxs., 2245

Drexel, Morgan & Co.
Hollow-ware, bbls., 106

Ketchum E. B. & Co.
Tin plates, bxs., 96

Korf Oscar
Machinery, pkgs., 4
Lathrop & Greenlee
Mfg. Co.
Stamp'd ware, cks., 1
Lamarache H. & Son
Boiled wire, pkgs., 1
Lawrence M.
Clocks, cks., 2
Middleton & Co.
Bx., 1

Moore T. B. & Co.
Spelter, ingots, 1991
Zinc plates, 3597

Moore's Sons J. F.
Per. caps, cks., 11

Miliken & Smith
Wire rods, bbls., 190

Pubst & A'ming
Hollow-ware, cks., 1
Fleish, Dodge & Co.
Tin plates, bxs., 90721

Black tappers, bxs., 200

Tin barrels, 25
Antimony, cks., 90

Rennie A. H.
Wire, cks., 2
Schovering, cks., 16
Gases, 15
Gun caps, cks., 16
U. S. stamping Co.
Tin plates, bxs., 32

Order,
Tin plates and term
Bx., 219
Tin plates, bxs., 10
Metal pan bottom
Tin, bbls., 100
Old brass nails, cks., 10
Old brass, cks., 72
Old brass, bbls., 200
Old brass bolts, cks., 10
Phumbago, bbls., 1
Tin, bxs., 70
Old metal, bbls., 10
Spelter, plates, 19
Spelter, cks., 2494
Zinc plates, 4197
Zinc, cks., 41
Bases, gr. cks., 10

COAL.

This is the "winter of our discontent" the Anthracite coal trade, the influence the unseasonable mildness of late prevailing being wholly demoralizing. To quote a cular prices is almost a burlesque, partly account of the small volume of business doing in new orders, and partly by reason the amount of cutting—among "outsider of course. There is some demand for middle sized Anthracite, but aside from this, little can be said. February is a

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month anyway, and activity at this season of the year would have been exceptional. No arrangements have been made for continued curtailment of production after the present week, but it is taken for granted that the plans for restriction adopted in the past will be adhered to in the future. The Pottsville *Miners' Journal* says: "The demand continues active for lump and steamboat sizes, but for all others there is not much inquiry. The production is light, owing to the restriction of operations at the mines, so that there is no great accumulation of Coal at tide-water points, and the conditions are favorable for a good spring trade." The Bituminous trade is dull, with prices in New York \$5 @ \$5.10 alongside.

In freights eastward there is little doing, departures being "scattering." The rate to Boston is \$1.50; to Providence, \$1; New Haven, 45 cents.

The total tonnage of anthracite coal from all the regions for the week ending Feb. 11, as reported by the several carrying companies, amounted to 323,383 tons, against 533,943 tons in the corresponding week last year, a decrease of 210,560 tons. The quantity of bituminous coal sent to market for the week amounted to 88,651 tons, against 70,430 tons in corresponding week last year, an increase of 18,221 tons. The report of the Lehigh Coal and Navigation Company, for the past year, states that the net earnings for 1881 were \$613,923.47, less a sinking fund of 10 cents per ton on coal, \$64,814.80, and the depreciation on coal improvements, \$65,332.85, making the surplus for the year \$483,775.82. A dividend of \$1 per share on 206,567 shares of stock was paid in December, leaving the balance to the credit of the dividend fund at the close of the year, \$471,445.20. There is great activity at the coal-shipping docks in Buffalo. W. L. Scott & Co. are putting up a new trestle. The "Erie" are getting their place in order for an increased business and the Pennsylvania Coal Company are dredging and making preparations for handling large amounts of coal.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy.....	10 @ 11
Light.....	10 @ 11
Copper Bottoms.....	10 @ 11
Yellow Metal.....	10 @ 11
Brass, heavy.....	10 @ 11
Light.....	10 @ 11
Composition, heavy.....	10 @ 11
Lead, heavy.....	10 @ 11
Thin Lead.....	10 @ 11
Zinc.....	10 @ 11
Pewter, No. 1.....	10 @ 11
Wrought Iron.....	10 @ 11
Light.....	10 @ 11
Stove Plate.....	10 @ 11
Machinery.....	10 @ 11
Plate Bars.....	10 @ 11
Electrotype plates.....	10 @ 11
Stereotype plates.....	10 @ 11
Small type.....	10 @ 11

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen.....	10 @ 11
White Cotton, New.....	10 @ 11
White, No. 1.....	10 @ 11
Seconds.....	10 @ 11
Soft Woollens.....	10 @ 11
Mixed Rags.....	10 @ 11
Gunny Bagging.....	10 @ 11
Jute Butts.....	10 @ 11
Kentucky Bagging.....	10 @ 11
Book Stock.....	10 @ 11
Newspapers.....	10 @ 11
Waste Paper and Scraps.....	10 @ 11
Kentucky Bale Ropes.....	10 @ 11

PHILADELPHIA.

Office of The Iron Age, 20 South Fourth st., Philadelphia, Feb. 23, 1892.

Pig Iron.—The market continues without animation, but prices are steady and without decided change. Consumption is large, and stocks are kept at a low point, so that there appears to be no immediate danger of a decline, unless under the influence of foreign advices. From a local standpoint an improving tendency might be looked for, on the ground that there is not the slightest sign of a falling off in consumption, and that large purchases will be a necessity some time within the next sixty days. In the meantime current production, to a large extent, is taken to fill old contracts, and there is likely to be only a very moderate supply to meet the requirements of the spring trade. The apathy of buyers during the past thirty days has been due in many cases to the fact that they had sufficient stock bought to carry them into spring, and finding their contracts could not be extended at the old prices, they decided to wait. This, for the time being, has had some effect, and those who were forced to sell have had to make concessions. But it is by no means certain that this will become general. Appearances indicate that consumers will be ready to buy quite as soon as producers are ready to sell. It is generally believed that during the past six months consumption has been slightly in excess of production. So far as we can see the conditions are not likely to be materially changed, in which case there is more probability of an advance than of a decline. There are a good many contingencies to be considered, however, and the future of the market is no more certain to-day than it was three months ago. The weakness in foreign markets, however, may offset any strength which may be developed here, and it is extremely probable that the United States markets will have to take some of their surplus at some price. Increased shipments of foreign Pig may be looked for if freights decline, or if our prices assume an advancing tendency. In point of fact, there are indications that holders are getting tired of their load, and from the tone of last week's *Iron Age* London correspondence, it seems a good time to stand firm under. The recent break in our grain markets is suggestive at the present time. For months grain was held at 12¢ @ 18¢ beyond its export value, but, as usual in such cases, the break came at last. Scotch and Cleveland Iron appears to occupy almost a parallel position, and a break is only a question of time. They may postpone the evil day by restricting production, as mentioned in our last week's cable, but their enormous stocks must be disposed of or be a constant source of danger, and while they exist there is no possibility of maintaining much, if any, higher prices than are now current. These conditions are pretty well understood by the

trade, so that a conservative policy is likely to be adhered to, and for a few weeks at least prices are not likely to vary a great deal in either direction. It may be several weeks yet before any very definite idea of the market can be formed, but as there is little or no disposition to speculate, developments are awaited without impatience. Business during the week has been chiefly on the basis of about \$24.50 @ \$25.50 at furnace for No. 1 Foundry; \$23.50 @ \$24 for No. 2, and \$22.50 @ \$23 for Gray Forge. The demand has not been heavy; many leading consumers feel inclined to take risks a few weeks longer, unless something transpires in the meantime to give character to the market.

Foreign Iron.—Bessemer is hard to move, the views of buyers and sellers being wide apart. Prompt shipments would command good prices—say, \$26.50 or over. In fact, a 2000-ton lot was sold a day or two ago at \$27, steamer shipment, delivery to be within twenty-one days. Later shipments are very irregular and weak, mainly in anticipation of lower freights. Sellers would shade \$26, but buyers appear to talk \$25 as about their idea of values for summer deliveries. We cannot find that there are prospects of much business being done for the present, and prices will probably have to be lower before the heavy buyers take hold. Middlesboro', No. 3, is dull, and prices are a shade easier, but there is scarcely any demand. Lots in store are offered at \$21.50 @ \$22, but concessions could probably be obtained by prompt cash. The entire market looks weak as regards foreign iron, and it would be impossible to obtain buyers, unless by offering considerable inducements.

Muck Bars.—The market is exceedingly dull, and there are more sellers than buyers, although prices are fully \$2 1/2 ton lower. Good qualities are offered at \$46, but buyers are scarce, and concessions would doubtless be made if there was a fair chance of business being secured by such a course.

Blooms.—Are steady at unchanged prices—say: Charcoal Blooms, \$75; Run-out Anthracite, \$62.50 @ \$65; Scrap Blooms, \$55, and Northern Ore Blooms, \$50.

Bar Iron.—There is no change whatever. There is a steady demand, and manufacturers have about all they can do to keep up with their orders, and in many cases are a good way behind. There is not quite as heavy a demand for forward delivery as there was, but this is thought to be due to the fact that there is less fear of higher prices, and in some cases parties think that perhaps they may do a trifle better by waiting. For the time being, therefore, the market appears to be comparatively dull, but there is reason to believe that many large orders will have to be placed some time before April. We know of orders amounting to several thousand tons held in abeyance in the hope that manufacturers will feel inclined to make concessions, if the present paucity of demand continues. It may be, however, that the delay is owing to the fact that the orders cannot easily be placed at current quotations, and it is probable that if they are placed at all within 60 days, they will have to be on the basis of to-day's prices—say 2.84. There is certainly a good deal less buying than there was two months ago, but so long as consumption can be maintained as at present, there is very little prospect for lower prices. The usual monthly meeting was held yesterday. Reports from the various mills were of a satisfactory character, and the present card was reaffirmed.

Structural Iron.—New business has been very quiet during the past few weeks, but the mills are very full of work, and likely to be for weeks to come. The outlook is good for the entire year, but prices are a shade easier when deliveries can be made convenient to sellers. Angles, 3.10¢ @ 3.25¢; Beams, 4¢; Channels, 4.2¢; Tees, 4.3¢. For future delivery, orders for Beams and Channels can be placed at combination prices.

Plate and Tank Iron.—The market continues in a very quiet condition, and prices are gradually becoming easier. There are very few inquiries except for small lots, and manufacturers are gradually running off their old orders, so that at the moment the outlook is not particularly encouraging. Prices are nominally unchanged, but for a good sized lot concessions would doubtless be granted. Skelp Iron has sold in lots of 300 to 500 tons each at about 3.1¢ @ 3.2¢, and there are still a good many orders to be filled. Tank Iron at 3.5¢; Relined at 3.75¢; Shell at 4¢; Flange at 5.25¢ @ 5.50¢, and Firebox at 6.25¢ @ 6.50¢.

Sheet Iron.—Continues same as quoted for several weeks past, with quite a large demand for the season. Small lots sell as follows:

Common Sheet, No. 27 and 28.....	5 1/2¢
Common Sheet, No. 29.....	5 1/2¢
Common Sheet, No. 30.....	5 1/2¢
Common Sheet, No. 31.....	5 1/2¢
Best Relined 1/4¢ @ 1/2¢ advance on the above.	
Best Bloom Sheets, No. 27 to 28.....	7 1/2¢
Best Bloom Sheets, No. 29.....	6 1/2¢
Common Red Plates, 3-16 to 16.....	3-4¢
Blue Annealed, 3-16 to 16.....	3-4¢
Best Bloom Galvanized, discount.....	20¢
Second quality, discount.....	20¢

Wrought Iron Pipe.—There is still a very active demand for Boiler Tubes, which are quoted 3 1/2¢ discount from list price. Gas and Steam Pipe is less active at about 5 1/2¢ off.

Steel Rails.—Inquiries are on the market for probably 30,000 tons, in lots of 3000 to 5000 tons each. It is a very difficult matter to arrive at exact quotations, although \$56 to \$58 is what sellers quote as their asking price. There is little doubt, however, that for deliveries extending over the entire year \$55 would be accepted by most manufacturers—probably less. Capacity for production is likely to be more than equal to all probable demands after next summer, so that manufacturers are disposed to close contracts on liberal terms when suitable deliveries can be arranged. An order for 15,000 tons of 35's was closed some time ago for delivery in Cleveland at \$62.50, and light sections are selling somewhat freely at about \$60 @ \$62.50, according to time and place of delivery. English 35's are offered at \$62.50, delivered at New Orleans, and it is probable that some business will be closed for that delivery.

Iron Rails.—Are entirely nominal, no transactions having transpired, so far as we can find. Prices are nominally \$48.50 @ \$52, according to size of order, weight of Rail and point of delivery. Small lots command full rates and are in fair demand.

Railway Fastenings.—Spikes are quiet and somewhat easier, say \$3 @ \$3.15, according to quantity.

Old Rails.—There is some inquiry for spot lots, and parcels of 100 to 400 tons each would probably command ready sale at \$30.50 @ \$31. We hear of small lots being taken at even higher figures, but for shipping they are offered at \$30 without finding buyers. There are no inquiries whatever for large lots, so that the market could easily be over-weighted.

Crop Ends.—Sales have been made during the past week, probably 1000 tons in all, at prices equal to something over \$27, Philadelphia delivery. They are offered for shipment at less money, but buyers are cautious, and take only small lots as required.

Scrap Iron.—Prices are steady; foreign commands \$31.50 @ \$32.50; Choice No. 1 American, \$33.50 @ \$34.50, and Cast, \$21 @ \$22.

Nails.—Steady and unchanged at \$3.40, net.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Feb. 21, 1892.

It is stated that at the meeting of the Western Iron Association on last Wednesday, the reaffirming of the card was carried unanimously, whereas at the former meetings there were several firms that voted steadily for an advance. It is the opinion of all well-informed operators that the action of the association was the very best under the circumstances, and the fact that the next meeting does not take place until April, accounts to some extent, for the quiet condition of the market for the raw article, as consumers have but little apprehension of any advance in the meantime; and besides, the most of the mills are pretty well supplied for the present. There is an apprehension expressed by some that the open winter, permitting outdoor work to be carried on almost without interruption, will have a tendency to restrict the spring trade, and, while there is, no doubt, some cause for this apprehension, the indications are that there will be at least a good average business.

Pig Iron.—The situation remains much the same as noted in our last report. Business continues quiet. The hull which has prevailed for a month past remains unbroken, but in view of the unprecedented consumption, an improved demand is confidently looked for in the near future. The receipts continue large, the great proportion of which is being placed on former contracts, delayed in delivery in consequence of the scarcity of cars. The great majority of the furnaces are sold ahead; hence, while the demand for the present is light, the same is true of the offerings, and furnacemen feel just as easy as mill owners; they are confident that by the time they have some iron to sell the mills will be ready to buy, and they do not lose sight of the fact that the consumption is going on as well as the production. It is very generally admitted that the stock in first hands is small, and at the present time furnacemen are no more anxious to sell for future deliveries than consumers are to buy; the one is just as independent as the other. Prices, as compared with a week ago, remain unchanged. We quote standard Neutral Mill Irons at \$25.50 @ \$26.50, cash and 4 mos. We can report a sale at \$26, cash, and \$27 @ \$28 for all-ore iron for mill use. Foundry grades, which appear to be in rather better request, are selling at \$26 @ \$26.50 for No. 2, and \$27.50 @ \$28 for No. 1. Bessemer is quoted at \$29 @ \$30; the last sale reported was at \$29, cash.

Muck Bar.—There is less doing and the market is generally reported weaker, although prices are not notably lower. Sales of good Neutral at \$45.50, cash, @ \$46, 4 mos. We are cognizant of an offer from New York to sell at \$45.50, delivered in Pittsburgh. A couple of weeks ago there were several lots offered here from Wheeling by some of the Nail mills who had a hitch with their men, but as we hear of no more offers from that point the presumption is that the matter has been settled.

Manufactured Iron.—While possibly the demand is not as pressing as it has been, the mills are all fully employed; many of them are still considerably sold ahead. The action of the Western Iron Association last week in again reaffirming the 2 1/2¢ card has caused an easier feeling on the part of buyers, many of whom have been trying to make contracts for the future in anticipation of an advance. Manufacturers are still refusing to contract for forward delivery at any fixed price, being determined to keep their business well in hand.

Nails.—There has been no material change in the general position of the market since our last report; business keeps up well for the season, and it will not be long now until the spring trade opens up. Prices unchanged at \$3.40, 60 days, with the usual abatement of 10¢ 1/2 keg, and 2¢ off for cash.

Wrought Iron Pipe.—Business in this department of the Iron trade has slackened off considerably as compared with what it was at the close of the year, and prices are lower. Discounts on Gas and Steam Pipe have been put up to 60 @ 60 and 5¢, and Boiler Tubes, are quoted at 40¢ off. Oil-well Casing remains unchanged at 85¢ 1/2 foot, net, and ditto Tubing, 25¢ 1/2 foot, net.

Rails, &c.—There is an easier feeling in the market for Steel Rails, but we repeat former quotations: \$58 for summer delivery, and near-by delivery at \$59 @ \$60; these are the asking prices. Railway Spikes remain unchanged at \$3.15 per keg, 30 days, for round lots, and \$3.25 in a small way. Splice Bars, \$2.70 @ \$2.80. Track Bolts, \$4 @ \$4.25.

Steel.—There is a continued steady demand for all kinds of Merchant Steel, but there has been no recent change in prices. Best brands of Refined Cast Steel, 3/4 to 2 inches, 12¢; ditto Crucible Machinery, 3/4 to 2 inches, 8¢; Open-hearth and Bessemer Machinery, 5¢; ditto ditto Spring, 5 1/2¢;

ditto ditto Plow, 5 1/2¢; Crucible Plow Steel, in slabs, 6 1/2¢; Cast Spring Steel, 8 1/2¢.

Bessemer Blooms and Billets.—Are still quoted firm at \$55 @ \$75 1/2 ton, according to carbon.

Scrap.—There is a fair business, with prices in the main steady. Wrought Scrap is quoted at \$33 @ \$35 1/2 net ton, the outside figure for selected Railroad; leaf and volute Car Axles, \$40; Coil Springs, \$31 @ \$32; Wrought Turnings, \$21 @ \$22; Blacksmith Scrap, \$29 @ \$30; Boiler Scrap (Rings and Sheets), \$31 @ \$32; Old Car Wheels, \$30 @ \$31, gross; Crop Ends, \$30 @ \$31; Cast Borings, \$15.50, gross; Shove Plate, \$15 @ \$16; No. 1 Heavy Castings, \$22 @ \$23.

Coke.—While there is a very fair business, it could be materially increased if transportation could be secured. Prices remain unchanged, \$1.75 @ \$2 1/2 ton, the outside figure for small foundry orders.

Window Glass.—Business at the moment is quiet, as it always is at this season, but the outlook is regarded as being favorable for an active spring and summer trade. No change in discounts.

Coal.—The Pittsburgh coal trade continues very much depressed, with but little prospect of any immediate change for the better. The down-river markets are all overstocked, and prices below actual cost. It is probable that an effort will be made here long to reduce the cost of mining, and if so, a strike will probably be the result. Our coal men never were in better condition for a strike than at present.

CHICAGO.

Office of The Iron Age, 47 and 48 Clark Street, cor. Lake Street, Chicago, Feb. 20, 1892.

Pig Iron.—The demand for nearly all grades of Pig Iron during the week has been almost equal to the supply. Our Wheel and Foundry Irons being those most sought for, quotations continue firm, and from present indications will undergo no material change for some time. We quote: Lake Superior Charcoal, Nos. 1 and 2, \$31 @ \$32; No. 3, \$33; No. 4, 5 and 6, \$34 @ \$36. Calumet, \$28 @ \$30; Silvery Soft, \$26 @ \$27; Crane, No. 1, \$29; No. 2, \$28.50; Thomas, \$28.50 @ \$30; Imported Scotch, \$30 @ \$31, and American Scotch, \$27 @ \$30.

Manufactured Iron.—The market continues very firm at the 3¢ rates, and the demand during the past week has been active. We quote: Bar, 3¢; Angle, 4¢; T, 4 1/2¢; Beams and Channels, 4 1/2¢ @ 4 3/4¢; Hoop at 3.80¢ rates. Sheet, Plate and Tank, 10 to 14 gauge, 4¢; 15 to 17 ditto, 4.30¢; 18 to 21 ditto, 4.60¢; 22 to 24 ditto, 4.80¢; 25 and 26 ditto, 5¢, and 27 ditto, 5.20¢. Patent Cold-rolled Shifting, dis. 20¢; Norway Iron, Original Bars, 5¢ rates; Norway Iron, re-rolled, 5 1/2¢ rates; Uster Iron, 4 1/2¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 7 1/2¢ off list; Wrought Boat Spikes, 4¢ rates.

Nails.—As previously noted, the demand for Nail continues active and prices very firm, as follows: \$3.45 1/2 keg for rod, to 60d. for carload lots, and \$3.55 for smaller orders, with the usual discount off.

Steel.—Tool, Machinery and Agricultural Steels are firm in price, and we are informed that mills are refusing large orders for anything like immediate delivery, unless at an advance over present quotations, which are as follows: Tool, 12¢; Machinery, O. H., 5 1/2¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 7¢, and O. H. Spring, 7¢ and Sligh Sheet, 5¢. Sheet, first, second and third quality, 12¢, 10 1/2¢ and 8 1/2¢, respectively; Crucible Plow, 6 1/2¢; Eagle Plow, 5 1/2¢; Iron Center Plow, 10 1/2¢, and soft Steel Center Plow, 10 1/2¢.

CHATTANOOGA.

Office of The Iron Age, Market and 5th Sts., Chattanooga, Feb. 20, 1892.

Business is fair. The weather continues unseasonably warm, and most inconvenient rain and mud continue to embarrass outdoor operations. Still the amount of transactions are enough to keep down stocks to a low point. In fact, most producers of crude or finished articles find difficulty in meeting contracts and supplying transient demands; some of them cannot, and they are holding back on offered contracts for future delivery, as they do not care, so long as they have plenty in hand, to incur further risk.

Pig Iron.—The trade is fairly active, being fully as encouraging in all respects as last month. There is a marked tendency to increase the output of the higher grades of cold-blast metals. We hear of projects looking to blowing in idle and increasing the products of active furnaces in the hematite region of West Tennessee. We quote: No. 1 Foundry, \$25 @ \$27; No. 2 Foundry, \$22 @ \$24; Gray Forge, \$20 @ \$21; White and Mottled, \$19 @ \$20; Car-wheel Metal, \$38 @ \$40.

Ores.—We quote: 30 % Brown Hematite, 1/2 ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25, delivered at furnace.

Miscellaneous Articles.—We quote Old Rails in good request at \$29; Wrought Scrap, \$24 @ \$27; Cast Scrap, \$14 @ \$17; Old Wheels, \$29 @ \$31.

Nails.—The nail market continues strong and prices steady at \$3.40 rates. Mills in this section are running at full capacity, and find themselves pressed to meet orders and fill standing contracts.

Manufactured Iron.—Bar we quote at \$2.75 rates; Railroad Spikes, \$3.30; Track Bolts, \$4.25; Fish Plate, \$3.

Coal.—Fancy Lump, \$4.50; Common, \$3.75; run of mine, at mills, \$2.

Coke.—Furnace Coke, \$3 at point of consumption; Foundry, 10¢ @ 12¢ 1/2 bushel.

Steel and Iron Rails.—The market here runs with Philadelphia and Pittsburgh. Steel we quote at \$60 as an outside figure. Iron, \$48 @ \$50, heavy and light sections, and practically nominal; Small T, \$55 @ \$57.

BOSTON.

February 18.—The market has presented a quiet appearance during the week. The demand has been very small, and buying has been almost entirely confined to the amount

necessary for immediate wants. The quotations remain nominally the same, though we hear of some lots being offered at slightly lower figures, and there would not seem to be a great amount of difficulty in obtaining lower figures. The tendency of the market is lower, and it is now in an easy position. If the freight rates for foreign iron should fall, which seems very probable though they are firm at present, Scotch Pig could be imported and sold profitably at present prices, and under such circumstances the prices of American Pig would decline. Prices at shipping ports for American Pig are \$26.50 @ \$27.50 for No. 1 X; \$25 @ \$25.50 for No. 2 X, and \$24 for Gray Forge. Small spot lots command \$2 @ \$3 1/2 ton above these quotations. The demand for foreign iron has remained light, and the market is quiet. Freight rates range from 16¢ to 19¢, and are held firmly on account of the importations of potatoes. Buyers are holding off from the high prices named by dealers. Stocks remain very small, and though there were a few sales made there has been nothing done in a large way. We quote Kalamazoo at \$24 @ \$25 for moderate-sized lots; Lamplum, \$27.50 @ \$28; Gartharrie, \$26.50; Canabrook, \$25 @ \$25.50; Gilegarnook, \$25 @ \$26; Clarence No. 3, \$22 @ \$23; Shotts, \$27.50 @ \$28. Old Rails.—There has been but a very small inquiry. We quote \$12 for American Manufactured Iron.—There are no changes to note in quotations of Manufactured Iron, and the demand remains very good for all classes. Bar Iron.—Bar Iron maintains its position firmly. The demand is active and stocks are only moderate. We quote \$3 at store. Horse Shoes are quoted at \$4.75 for Burden's and \$5 for Perkins'. Norway and Swedish are in good demand, and very firm at \$4.25 for Bars, and \$5 @ \$5.25 for Shapes. Plate Iron.—Prices are unchanged, and there is a continued good demand. Deliveries are a little better. We quote Tank at \$3.60; Relined at \$4; Shell at \$4.45; Flange at \$5.45. Tubes are in good demand, and quoted nominally at 37 1/2¢ from last, but sales are made at 40¢ off.

Sheet Iron.—The demand continues fair for the season. We quote: Sheet Iron, 4 1/2¢ @ 4 3/4¢; ditto Relined, 5 1/2¢ @ 5 3/4¢; Galvanized, 8 1/2¢ @ 11 1/2¢; Russia, 10 1/2¢ @ 11 1/2¢. Steel.—There is a steady and fair demand ruling. We quote: Best English Cast, 14¢ @ 15¢; American ditto, 12¢ @ 13 1/2¢; Bessemer Machinery, 5¢ @ 6¢; Wedge and German, 7¢; English Spring and Calking, 7 1/2¢ @ 7 3/4¢; ditto American, 5 1/2¢ @ 6¢; Tires, 4¢ @ 4 1/2¢; Sligh Shoes, 3 1/2¢ @ 3 3/4¢. Mails.—There is no change in the prices, and the demand continues good. We quote \$3.40, net, for rod, to 60d. Copper.—Ingot Copper is quiet and easy here, but we hear of sales of considerable in New York at 107 @ 10 1/2¢, according to delivery, but it was mainly the result of speculation. The combination prices of Manufactured Copper are unchanged. We quote: Sheathing, 28¢; Brackets, 30¢ @ 32¢; Bolt, 50¢; Copper Bottoms, 31¢ @ 32¢; American Yellow Sheathing, 31¢ @ 32¢; Yellow Metal Bolt, 2¢; English Yellow Sheathing Metal, 10¢ in board.

Lead.—The market has been quiet, and local lots are quoted at \$5.20, and jobbing \$5.50. Manufacturers' prices are unchanged. We quote: Bar, 6 1/2¢; Pipe, 7 1/2¢; Sheet, 8¢; Tin-lined Pipe, 15¢; Tin Pipe, 35¢—all less 10¢. Spelter.—The demand has remained very light, but the prices remain steady at 6¢. Sheet Zinc is also quiet at 8¢. Tin.—The London market has been irregular, advancing to £114, and then dropping to £111, where it is now quoted. The market here is quiet. There have been sales in New York at 24 1/2¢, cash, January shipment, and large lots were sold at 24 1/2¢ @ 25¢. Tin Plates.—Trade has been of fair proportions, and the market remains steady at quotations. We quote: Charcoal Bright, \$6.75 @ \$7; Tarnes at \$6 @ \$8; Okeon, \$5.75 @ \$6; ditto Tarnes, \$5.50 @ \$5.75. Old Metals are irregular in price and difficult to quote, owing to the unsettled condition of the Ingot Copper market. Bolt Copper will not bring over 10 1/2¢, and dealers are willing to sell heavy Brass at 13¢, and Yellow Metal Sheathing at 11 1/2¢ @ 12¢. Light Brass is offered at 11 1/2¢ @ 12 1/2¢.

We quote:

Bolt Copper.....	10 1/2¢
Heavy ditto.....	10 1/2¢
Kettle bottoms.....	10 1/2¢
Composition on No. 1.....	10 1/2¢
Heavy Brass.....	13¢
Y. M. Sheathing.....	11 1/2¢
Light Brass.....	11 1/2¢
Lead, solid.....	4 1/2¢
Ditto, Tea.....	4 1/2¢
Zinc.....	4 1/2¢
Pewter, No. 1.....	6 1/2¢
Ditto, No. 2.....	5 1/2¢

—Commercial Bulletin.

CINCINNATI.

February 20.—Pig Iron.—Nothing has transpired in the past week to alter quotations in prices; sales have been confined to temporary demand for immediate consumption. It is conceded that consumers of every class are without supply for more than immediate use, and that the stock on hand and the current make will not do more than fill the gap. Full estimates of the production of Irons in the West for this year have been made; guesses are being made as to what the consumption will be, and it is thought that all of the present stock on hand and the new output of furnaces will be demanded, and at a price not less than the present. Sales during the past week were for No. 1 Hanging Rock Charcoal, \$29.50; No. 1 Hanging Rock Coke, \$25.50 @ \$29—Southern brands \$1 less. "Forge," no quotable sales. No. 1 Silver Gray Softeners, \$26 @ \$26.50; No. 2, \$1 less. The holders of smaller lots, fugitive brands, and of unknown quality, are trying to sell.

LOUISVILLE.

Messrs. Geo. H. Hull & Co., Commission Merchants, report to us as follows, under date of Feb. 18, 1892: The market continues quiet, but without material change in price, the tendency, if any different, being rather in favor of buyers. Some furnaces not willing to sell a short time since for future delivery now show a disposition to book orders at market rates. Mill Irons are still scarce for immediate delivery; nearly all furnaces are more or less behind on their contracts. There is little or no market for

Car Wheel Irons. Foundry Irons are in light demand. Very little, however, is offering, and the prices are unchanged. We quote for cash:

FOUNDRY IRONS	
No. 1 Hanging Rock, Charcoal	\$25.00 @ 31.00
No. 1 Southern, Charcoal	28.00 @ 29.00
No. 1 Hanging Rock, Stonecoal and Coke	27.50 @ 28.00
No. 1 Southern, Stonecoal and Coke	27.00 @ 27.50
No. 2 "American Scotch"	25.50 @ 26.00
Open Silver Gray	25.00 @ 26.00
Close Silver Gray	23.50 @ 24.00

MILL IRONS	
No. 1 Charcoal	24.00 @ 25.00
No. 1 Stonecoal and Coke, Neutral	24.50 @ 25.00
No. 2 Stonecoal and Coke, Neutral	21.50 @ 22.00
No. 1, Stonecoal and Coke, Cold-short	21.00 @ 22.00
No. 2, Stonecoal and Coke, Cold-short	20.00 @ 21.00
White and Mottled, Cold-short and Neutral	21.00 @ 22.00

CAR WHEEL IRONS	
Hanging Rock, Cold-blast	36.00 @ 38.00
Hanging Rock, W. B.	30.00 @ 32.00
Alabama and Georgia, Warm and Cold-blast	34.00 @ 38.00
Central Kentucky, Cold-blast	34.00 @ 37.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of Feb. 18: Finished Bars are steady, though evidences of a better supply increase. The output of the mills is greater than ever before. Every one seems to be struck anew with the pretty well established fact that the way to make a mill pay best is to run it for all it is worth. Sheets are offering freely, and at concession in lots. Nails are in good demand, though jobbers are letting stocks run down rather than pay new card. Hardware is active, and in view of advances, recent purchases of Hinges and goods of that description have been heavy. First-class tools are hard to get in sufficient quantity for demand. We note an advance in Padlocks. The Ohio River is again over its banks, and into the houses on our levee. Trade is depressed by the continued wet. The recent cotton panic has affected Southern credits seriously in some quarters. Short extensions are asked by country merchants. A few weeks of good weather would help things amazingly.

ST. LOUIS.

MESSRS. HOPPER, PLUMB & Co., Pig Iron and Iron Ore Merchants, 417 Pine street, write us, under date of Feb. 18, 1882: There is no change to note in this market, the tone of which is still dull. Car Wheel Irons being particularly so. Prices nominally are:

HOT BLAST CHARCOAL	
Missouri	\$27.00 @ 28.00
Ohio	30.00 @ 32.00
Southern	27.00 @ 28.00

COAL AND COKE	
Missouri	None offering
Ohio	27.00 @ 29.00
Southern	27.00 @ 29.00

MILL IRONS	
Red-short	26.00 @ 27.00
Neutral	25.00 @ 26.00

CAR WHEEL AND MALLEABLE IRONS	
Missouri	28.00 @ 35.00
Southern	35.00 @ 37.00
Ohio	32.00 @ 40.00

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of Feb. 20, 1882: Trade continues ruling about the same as last reported. Stocks are unusually light, and obtainable much too slow for pressing wants. Values remain firm and unchanged at annexed figures:

Ref. Bar Iron, 1 to 6 x 3/4 to 1 1/2	\$28.00 @ 30.00
" 1 to 4 1/2 x 1 1/2 to 2 1/2	28.00 @ 30.00
" 3/4 to 2, Round	28.00 @ 30.00
and Square	28.00 @ 30.00
Hoop Iron, 1 1/2 wide and upward	3 1/2 @ 4
Band Iron, from 1 1/2 to 4 in. wide	3 1/2 @ 4
Horse-shoe Iron	3 1/2 @ 4
Norway Nail Rods	13 1/2 @ 14 1/2
Black Diamond Cast Steel	9 @ 9 1/2
Machinery Steel	8 @ 8 1/2
Cast Spring Steel	8 @ 8 1/2
Common Horse Nails	10 @ 11 1/2
Perkins' Horse shoes 3/4 keg of 100 lbs.	54.87 1/2
" Mule shoes	5.87 1/2

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENGL., Feb. 6, 1882.

THE SITUATION

has been greatly complicated during the week by various causes which have combined their forces to depress the markets. Chief among these causes has been the very serious financial panic, beginning with the failure of the Union Générale, at Paris, which spread all over the Continent, and brought about a sharp advance of the bank rate here. The raising of the official discount rate operated all round, not only in our own money market, but also abroad, all the national banks following the lead of the Bank of England. A few stock exchange failures resulted, but they were for small amounts only, and in respect of absolute results, therefore, the effect of the panic here was limited. The dearer money, however, knocked out the speculators at once, as they could not afford to pay 6 or 7 per cent for accommodation. As one immediate consequence, Scotch Warrants and all open quotations fell sharply, the drop being most marked in copper, in which a heavy "bear" account had been running. Warrants suffered the more as it was rumored that they were largely held by some of the French speculators. Events do not seem to have fully confirmed that rumor, although it is no secret that a good deal of business is regularly done in warrants by French and other Continental dealers. Another cause of the depression in prices has been the serious agitation, accompanied by numerous strikes, of the puddlers and other iron-workers in the North of England. These men belong to the Board of Arbitration and Conciliation, and are supposed to be governed by its rulings. They consider, however, that they are entitled to an immediate advance of 7 1/2 per cent, and that being refused by their employers, they struck last week to the number of 6000 or 7000 at

Stockton, Darlington and other places. Many of the employers appear to be of opinion that the men deserve some sort of advance, in compensation for the deductions made during the dull period, but they are mostly resolved not to give it so long as the operatives remain on strike. This attitude is so well exemplified by the following letter from Mr. William Whitwell, addressed to the President of the Board of Arbitration, that I give it in full: "You may be aware that after ascertaining the spirit of the Stockton men and their exact position, I was obliged to admit that on several occasions the masters had behaved toward their men in a manner that was neither in accordance with the rules nor justifiable. The men admitted they had done wrong in striking, but appeared to feel that they were not represented by their leaders. After the fullest consideration, I decided that it was in the interests of the trade, as well as arbitration, that I promised in case they went to work on Monday morning to support an advance during the currency of the present agreement of 7 1/2 per cent. Let me remind you that our returns of the make of iron in this district for the year ending December 31, 1879, show under 300,000 tons, and the make of last year about 600,000 tons; and the circumstances of demand for labor are entirely altered since the sliding scale was commenced. In confirmation of the above suggestion, I telegraphed Mr. John Alderson: 'Have promised to vote in favor of 7 1/2 per cent. advance, in consideration of the altered state of trade and extra demand for labor, if men start Monday morning, promising to abide by the rules of the Board. Will not do so if they decline to work Monday, as being departure from practice existing when sliding scale arranged.' I have this morning had a call from Mr. Alderson, who appears to be authorized to state that the men will return to work on Monday night if I will support 7 1/2 per cent. advance, and I have given him the following memorandum: 'The men must work full week as they did when the Board arranged the existing sliding scale. There must be no departure from this practice and no stipulation of any kind. The Board is alone to settle everything for future guidance and arrangement. No advance will be considered unless Stockton men go to work Monday morning. I support a 7 1/2 per cent. during three months if they do so, making the rates to April 30, 8 3/4 per cent, and 7 1/2 per cent. instead of existing 7 1/2 per cent puddling, and proportionate mill rate.' You will observe from the above message that I absolutely refuse to depart from the blue bill as to the men 'working full,' and referring everything to the Board; but I promise when they are at work to support what I believe to be a reasonable modification of rate in substitution for present scale. It is desirable that the men should return to work and harmony be restored, and the Board take its proper position and arrange everything."

The men held a series of mass meetings on Saturday and manifested a very strong feeling against resuming work so long as the question remains unsettled. In some instances, however, work will be recommenced to-day, as will be seen from the following résumé of the situation presented at a general meeting at Darlington on February 4: "Albert Hill, Darlington, men agreed to work pending the decision of the board; Rise Carr, Darlington, ditto; Bowesfield, Whitwell's, Westbourne, Malleable, Moor, West Stockton Iron Works (all of Stockton), the men object to work until concession of 7 1/2 per cent. is made; at Ayrton Works, Middlesbrough, Hartlepool Iron Works, the men refuse to work; Consett, in favor of work, to refer dispute to arbitration; Monkwearmouth, ditto; Abbott's, Gateshead, refuse to go in until advance is given; Jarrold, millmen willing to work, but puddlers against; Witton Park, willing to work, and refer matter in dispute to the board; Bishop Auckland, refuse to work; Wear Valley, Sunderland, for work, and dispute referred to the board; Tees Side Works, Middlesbrough, if the concession was not made by this (Monday) morning men to strike."

The dispute is a most unfortunate one, and especially so as showing the difficulty of managing workmen on a rising market. Yet another reason for the weakness of the past week is to be found in the discussion which is already being carried on as to the probable range of production in Scotland and in the North of England after March 31. As yet nothing whatever is known of the intentions of the ironmasters of the two localities named, and nothing is likely to be known which can be relied upon for some weeks ahead. There is strong presumptive evidence, however, that the present restrictive policy will not be continued as it now stands. Everything indicates that the Cleveland smelters will not renew the bonds under which they voluntarily placed themselves on October 1, 1881. They have managed to reduce the amount of their reserve stock to a considerable extent, but the Scotch makers have not done so—every week since the limitation came into force having witnessed a fresh addition to the reserves held by Connal & Co. The knowledge of these, and some collateral facts, is thus early discounting the action which may be taken at the end of the quarter. The continued growth of stocks is more than anything responsible for the renewed weakness of Scotch prices, and I see nothing whatever to lead to higher rates unless one of the two contingencies mentioned in my last should come about. While writing on this subject I should, perhaps, allude more particularly to

SCOTCH WARRANTS.

as to the security afforded by which documents there are rather curious statements in circulation. It is asserted that most of the iron sold for home consumption or shipped is No. 1, the quantity of No. 3 changing hands being very small indeed in comparison. If it be so, and if it has been so for any considerable period, it becomes an open question whether there is a sufficient proportion of No. 1 pig iron in Connal's stores to cover the "Two-fifths No. 1" specified and guaranteed on the face of each warrant. I do not pretend to be able to state whether these allegations are well founded, or the contrary, but I have mentioned the matter as being of some interest to your readers. I do know, however, that some of the No. 3 pig made

and stored during the boom of 1879-80 is of the most inferior description possible, and I think I am correct in asserting that much of that rubbish yet remains in the warehouses of the official storekeepers. "The day will come," as the tragedians say, I suppose, when the whole system of pig iron making, storing, selling, holding and manipulating at Glasgow will be thoroughly inquired into and fully made known to the world. Until that "Day of Judgment" the system will remain enveloped in mystery, and warrants will continue to be the sport of speculators. Even speculation should have some little foundation, I suppose; yet I think those who know most about that little ring of gentlemen who occupy one corner of the Royal Exchange at Glasgow will also know best upon what a slight superstructure their daily operations rest. I have no wish to slander a most respectable body of gentlemen, yet I venture to believe that their daily operations may rank with the keenest of modern gambling—that is to say "speculative operations."

FACTS AND PRICES.

I have gossiped so long about odd matters that I must now come to the narration of matters of fact, beyond those already placed on this record. Primarily I may note that warrants have declined in an irregular way to 40/9, with makers' brands in proportion, and that Scotch shipments are small. West Coast hematites have been easier in the open market owing to the sales of second holders. Mixed Nos. of 1, 2 and 3 may be had at 61/6 @ 62/6, but the volume of business is so heavy that values are likely to rise. In Cleveland No. 3 ranges from 42/ @ 42/6. The local consumption is on a large scale and shipments are improving. Elsewhere all iron may be said to be moderately steady, but quiet. In South Staffordshire, Lord Dudley and Messrs. Barrows have issued circulars reaffirming their old figures for bars (£8, 2/6, and £7, 10/ respectively), as well as soliciting orders thereat. Their action in this respect is justly taken to mean that they are not fully occupied. Some of the houses outside the pale of the "list" scheme are actually selling at higher figures than their higher-class competitors; consequently, quotations are quite higgledy-piggledy, and largely unreliable. As regards bars and other sorts of finished iron intended for the United States, for which merchants and agents here hold orders, I think I ought to give a word or two of warning and advice. Those who are intrusted with the placing of these orders ought not to be allowed to do so indiscriminately. I have heard of instances recently in which makers who have reputations and wish to preserve them, have been met with remarks to the effect that quality is no consideration whatever, any more than special suitability of particular brands for the American market, price only being the criterion. This being so, would-be buyers of English iron should either indent specifically for known brands, or should entrust their interests to perfectly competent hands. The merchant pure and simple not unnaturally cares for nothing outside his own profit. Where he has no margin left to his option he is, of course, compelled to buy at a price; if placed upon his honor and the purpose specified for which the iron is required, he will generally do his best to meet his client's views. Welsh bars are steady at £6 or thereabouts, and Staffordshire as before. There is a very light inquiry for iron rails, heavy sections being quoted at £5, 10/ @ £5, 15/. In old rails there is more being done. Buyers offer 97/6 for old D. H., c. i. f., Baltimore or Philadelphia, while sellers ask £5, and appear inclined to stick to their guns. "For old flame rails 85/, c. i. f., New York, and 90/, c. i. f., Philadelphia, have been paid. In heavy wrought scrap iron there is little doing, prices being nominally 85/ @ 90/, c. i. f., New York. Selected parcels of wrought scrap are scarce. Old cast iron railway chairs are quoted about 46/ per ton, or equal to about 62/, c. i. f., New York, whence there are new inquiries. These chairs are mostly old Cleveland iron. There is not much doing in blooms, at £5, 12/6 @ £5, 15/, and steel rails are slack, for futures, at £6, 5/ @ £6, 12/6 for 35 pounds and upward. There are inquiries for 56-pound sorts for the States, but no new business is reported. Tin plates are weak at 18/ @ 18/6 for common I. C. cokes.

SCOTCH PIG IRON

irregular at 50/8 @ 49/5 for warrants, now 49/9. There are 106 furnaces blowing, against 123 this date last year. Shipments to date in 1882 show a decrease of 2053 tons, while importations of Cleveland pig into Scotland have increased 7604 tons. In Connal's stores there are now 631,080 tons, a decrease of 10 tons. James Watson & Co., Glasgow, February 4, say: "The market for Scotch pig iron warrants has been depressed this week, and makers' iron is likewise lower in price, the demand being of a limited nature. On Monday the market opened at 50/8 and receded to 50/, and on Tuesday forenoon as low as 49/4 1/2 was accepted, closing at 49/7 1/2 ton. On Wednesday the market was irregular, the price fluctuating between 49/5 1/2 and 49/10 1/2 ton. Yesterday the market was rather firmer, with transactions from 49/8 to 50/, cash, closing at 49/10 1/2 ton. To-day the market was dull, and a small business was done between 49/8 and 49/10 1/2, closing sellers at 49/9; buyers near. The shipments last week were 8041 tons, as compared with 8906 tons for the corresponding week of last year."

We quote:

	No. 1.	No. 2.
G. M. B., at Glasgow	51/	48/6
Coltness, "	50/5	54/
Langloan, "	51/	51/6
Barlathrie, at Glasgow	50/	53/
Summerlee, "	50/6	52/
Caldar, "	50/6	52/6
Cambridge, "	50/6	52/
Benzarnock, at Ardrossan	54/6	52/
Erdington, "	51/	48/6
Damellington, "	51/	49/6
Shotts, at Leith	50/6	55/6
Kin-sell, at Bo'ness	50/6	49/6
Carron, at Grangemouth	51/6	50/6

John Swan & Bros.' figures agree with these. CLEVELAND PIG IRON has been weaker, but is now reviving, the ironmasters' returns for January showing a reduction in stocks of about 700 tons. Current rates for G. M. B., f. o. b. makers' wharves in the Tees for net cash, less the usual 2 1/2 % are:

No.	Foundry	45/	Mottled	41/
" 2	"	44/6	White	40/6
" 3	"	43/6	Refined Metal	60/
" 4	"	42/	Kentledge	42/6
" 4	Forge	41/6		

To the United States there were sent last week two cargoes of various kinds of iron, steel and Bessemer blooms from West Hartlepool. The local correspondent of the *Ironmonger* states that he has good grounds for believing that Thomas Furness & Co., of West Hartlepool, have contracts for the carrying of not less than 30,000 tons of rails, blooms and pig iron to the United States during the next four months. There can be no doubt that large American purchases of iron and steel have recently been made in this country.

WEST COAST HEMATITES

are quiet for reasons already named, but there is a large home, American and Continental demand, so that prices are likely to rise. Present quotations for ordinary manufactures are 61/6 to 62/6, and makers' brands as under:

	No. 1.	No. 2.	No. 3.
Cleator	65/	61/	62/
Lonsdale	64/6	61/6	62/6
Workington	64/6	61/6	62/6
West Cumberland	64/6	61/6	62/6
Lowther	64/6	61/6	62/6
Loss Bay	64/	61/	62/6
Distington	64/	61/	62/6
Harrington	64/6	61/6	62/6
Salway	64/6	61/6	62/6
Marport	64/6	61/6	62/6

Cumberland ore is 16/ @ 18/ per ton at the mines, and Spanish, 18/ @ 18/6, ex ship, with 52 to 54 percentage of iron guaranteed. There are 65 of 81 furnaces at work in the district, making 32,500 tons weekly. Last week's shipments were 20,592 tons pig and 4445 tons rails. A great deal of Irish iron ore, from the hematite mines of Antrim, is being imported into Barrow, Whitehaven, &c., and is being readily sold.

FREIGHTS

are still high at late rates, although it is rumored that charges for Scotch Pig are not quite so stiff. I quote steam Glasgow to New York 21/ @ 22/6 asked, and 20/ @ 21/ paid; sail ditto about 15/; Liverpool to New York, 17/6 and 10 1/2; and Philadelphia 22/6 and 10 1/2; Tees and Tyne to United States ports, 18/ @ 20/. As to Bristol channel ports, Mr. Frederick Edwards, of Cardiff writes to-day: "The stocks destined for America of blooms, Rails, &c., at the various ports of this channel, are very large; in fact, larger than they have been for a considerable time past; therefore, as soon as the freight market returns to something like its normal condition, we may look for a large increase in the exports. The present shipments, representing as they do simply those parcels which are bound to be delivered at any cost of freight, it can be taken for granted that no increase in freights will take place beyond present quotations, as the Stocks above alluded to can wait a more convenient season of delivery. The rates paid and current just now vary but little from my last quotations: I give New York, 21/; Baltimore and Philadelphia the same, for room by steamers. Little or nothing has been done in sailing vessels during the month. For the Southern ports the demand is not so strong, 28/ was the last paid for Galveston Bay, and for any pressing shipments the same rate would have to be paid to command an early boat. New Orleans was done at about 13/. All by steam."

SOUTH WALES AND MONMOUTHSHIRE

are fairly busy. The exports of last month from the ports of the Bristol Channel included the following items: To New York, 2070 tons rails; 59,232 boxes tin plates; 3085 tons blooms; 650 tons scrap iron; 600 ingots tin; 50 tons bar iron, and 1673 pigs of lead. To Baltimore, 850 tons rails. To Galveston, 1971 tons rails. To Corpus Christi, 331 tons rails. To Vera Cruz, 480 tons rails. These are smaller quantities than last month, but the falling off is explained by Mr. Edwards' remarks under "Freights" above. The tin-plate works are tolerably well engaged, but prices are weaker. One London merchant quotes 17/ @ 17/6 for ordinary cokes, and another firm 18/3 @ 18/6—both in Liverpool.

HARDWARE AND CUTLERY

are for the most part rather quieter, although the larger firms at Birmingham, Sheffield and Wolverhampton remain well employed. The extremely mild winter has spoiled the usual "season" trades in heating and similar apparatus, although it has stimulated builders' fittings and the like. The Birmingham gun makers are doing well for the United States, as also are the Sheffield cutlery manufacturers. In the latter trades prices are rising, owing to the dearth of ivory. It may, perhaps, be useful for some of your readers to possess the appended trade prices of ivory handles at Sheffield: Strong handles—4 1/2 inch, range from 26/ @ 28/; 4 1/4 inch, 22/ @ 31/; 4 inch, 13/ @ 17/6; 3 1/2 inch, 11/ @ 15/3; 3 1/4 inch, 9/9 @ 12/9; 3 1/2 inch, 9/ @ 11/9; 3 1/4 inch, 7/3 @ 10/; 3 1/4 inch, 6/3 @ 8/9; 3 1/2 inch, 5/9 @ 7/9; 3 inch, 3/9 @ 6/3; 2 1/2 inch, 2/6 @ 5/; 2 1/4 inch, 2/3 @ 4/6. Thin handles—4 1/2 inch, 23/ @ 32/; 4 1/4 inch, 19/ @ 28/; 4 inch, 12/ @ 16/3; 3 1/2 inch, 10/6 @ 13/9; 3 1/4 inch, 8/9 @ 11/6; 3 1/2 inch, 8/ @ 10/9; 3 1/4 inch, 6/3 @ 8/9; 3 1/2 inch, 5/3 @ 7/9; 3 1/4 inch, 4/9 @ 7/; 3 inch, 2/9 @ 4/6; 2 1/2 inch, 1/6 @ 3/; 2 1/4 inch, 1/3 @ 2/9. African handles—4 inch, 16/6 @ 27/; 3 1/2 inch, 12/ @ 20/; 3 1/4 inch, 9/3 @ 16/; 3 inch, 6/ @ 11/; 4 1/2 C, 32/6 @ 52/. In Scotland, American brass cokes, &c., are said to be making some headway.

The new grain elevator of the New York and New England Railroad Company, on the South Boston flats, is now completed, and only awaits the construction of the conveyers to be used in carrying the grain to the piers, when it can be deposited in the holds of vessels lying alongside. The elevator itself, which is constructed of brick for the lower story, and of wood for all above the first 20 feet, measures 162 feet in length by 80 feet in width, and reaches a height of 137 feet. It is situated on the 50-acre tract purchased of the Boston and Albany Railroad, at the head of the dock commanded by the company, and by means of the conveyers, already alluded to, grain can be carried to vessels loading in any one of the several docks now completed, or that will hereafter be completed, in the immediate vicinity of the elevator. There are thirty-eight bins, 70 feet in depth, holding in the aggregate 530 bush-

els of grain, ten carloads of which can be unloaded at once upon the two tracks which run through the building. The motive power to operate the machinery is furnished by a 500-horse power condensing engine with 34 x 36-inch cylinders, and is of sufficient power to operate the proposed extension of the elevator to double its present dimensions whenever the traffic will require it. In fact, the plans of the company have been so arranged that the elevator can be enlarged to a capacity of 2,000,000 bushels, from which grain can be delivered to a large number of vessels at the same time.

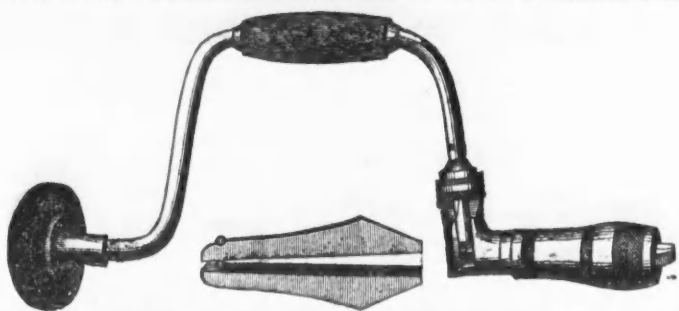
Value of European Tunnels.

The St. Gothard Company promise to have their whole railway line in operation by next July. The tunnel of that name has been for some time in working order, and of itself is a great boon to tourists who have no taste for scaling the Alps. Connections on the Swiss and Italian sides of the mountain continue to be made by diligences. When there is an uninterrupted railway track stretching through Switzerland into Italy—so that Americans can perform that journey without any loss of their ineffably precious "time" to which they sacrifice everything else—they will then swarm over these picturesque regions as never before. The Mount Cenis Tunnel between France and Italy offers them an alternative all-rail track via Paris going or returning. One long tunnel is as monstrous and disagreeable as another. But it is satisfactory not to be obliged to traverse the same line twice and to feel that every mile taken is over fresh ground. It adds so much to the amount of the world supposed to be seen by the traveler. The St. Gothard Tunnel and Railway are the only great European novelties proposed for the present year of grace. But other tunnels are talked of. The most remarkable of these new schemes is that for piercing the Pyrenees. When that is done the tourist can rush through France into Spain by lightning express and add the whole Iberian peninsula to the contents of his note book. Few Americans ever visit Spain or Portugal—the Pyrenees forming one bar among others to their wanderings in that direction. Tunnels are benefiting Italy more than any other country. She thinks she cannot have too many of them. So the Italians are prospecting for a tunnel to connect their island of Sicily with the boot itself. The intervening strait of Messina ranges from two to eleven miles wide, and can be easily tunneled. The impetuous American can then include *Aëna* among the stock sights of his tour of three or four months, and feel that he has missed one thing less.

But the greatest of all facilities of travel still to be provided is the Channel tunnel between Dover and Calais. The saving here will be not so much in time as in discomfort. The chops of the Channel will then be stripped of their terrors, and one misery be subtracted from the inevitable total of the best regulated European tour. The last news from this gigantic work is encouraging. It is now progressing at the rate of twelve yards per day of seventeen hours, and this will soon be increased by improved machinery to one yard an hour. This is the speed attained on the English side. The Frenchmen are not driving their adit quite as fast. But on both sides the experimental boring gives the liveliest satisfaction. Only dry gray chalk is encountered. No water has yet been struck, and it is believed that the same chalk formation, free from springs, underlies the whole width of the Channel. If this theory proves true the construction of the tunnel is reduced to a certainty. All the money needed has been more than subscribed, and founders' shares are at a premium. There is nothing really startling or even surprising in the scheme. The distance from Dover to Calais is only 21 miles, and this should not and does not frighten the engineers and capitalists of a country which can boast over 38,000 miles of underground tramway and roadway for mining and other purposes. The prosecution of the Channel tunnel to a successful completion in the course of a few years may therefore be predicted with some confidence. Englishmen and Frenchmen may discuss its bearings on international commerce and other relations. But it will have quite another and exclusive interest for Americans with squamous stomachs.—*Journal of Commerce.*

A Proposed Tin Plate Works in Cleveland, Ohio.—Mr. J. F. Duffy, late of the Duffy Tool Company, of South Chicago, has been prospecting for some time past for an eligible location in which to establish machinery and tool manufacturing works, and on account of the superior advantages offered by Cleveland, Ohio, he appears determined to remain in that portion of the country. As Mr. Duffy intends entering largely upon the manufacture of tin plate, his works will have an additional value to the city, because he enters into no competition with industries already existing there. Some years since he studied the methods of producing tin plate as practiced in England and Wales, and after experimenting for two years he produced a tin equal in quality to the imported material, but at a considerably greater cost. The difficulty lay in the fact that the hours for labor in Great Britain are longer, and the price paid workmen less than in this country. In England the metal plates prepared for tinning are manipulated by a gang or "stow" of men, numbering eight, who run the plates into seven different vats before it comes out in the bright familiar form. It was evident that hand-prepared tin would be too expensive for the American market, and Mr. Duffy, consequently, perfected a system of vats, rolls and other appliances, all working automatically, whereby the required material could be manufactured at one-fourth the cost of that produced by the manual labor process. The value of Mr. Duffy's proposed additions to the industries of Cleveland will be seen at a glance, and it is to be hoped that further developments will take place shortly.

A patent was recently granted in Germany for an indicator with duplicate pistons, springs and cylinders, being connected with both ends of the cylinder, so as to produce a figure showing the amount of work done in a complete double stroke.



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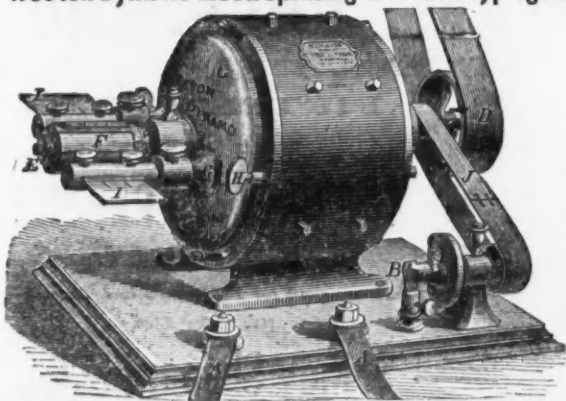
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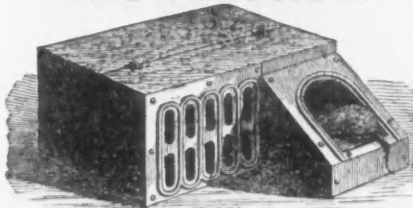
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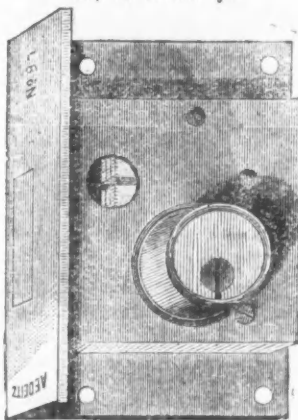
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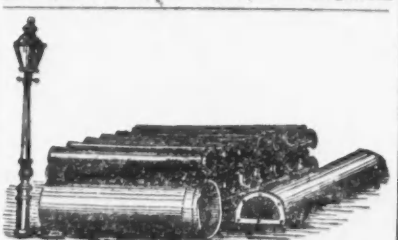
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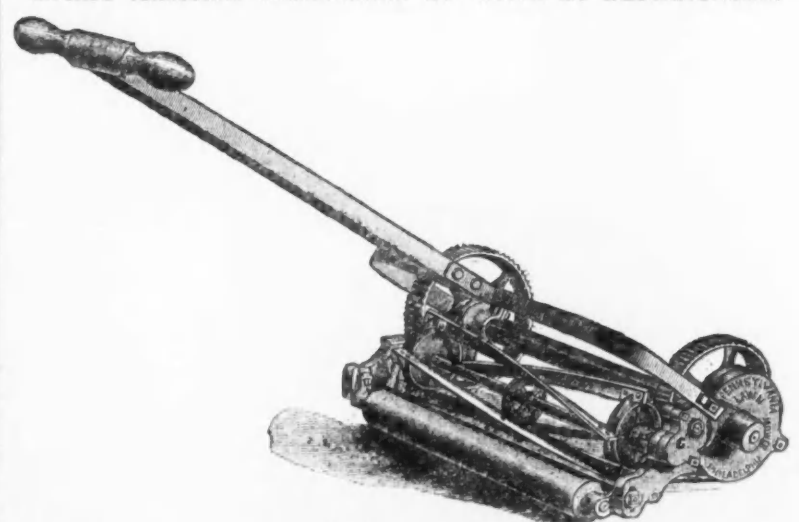
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IN GREAT VARIETY.

New England Gate Hinges. Sad Irons, Polishing Irons.
Woolman's Self-Closing Gate Hinges. Mrs. Cook's, McCoy's and New England Polishing Iron.
Barn Door Hangers, Rolls & Rail. Laundry and Tailors' Irons,
Sliding Door Rolls and Way. Tailors' Box Irons.
Butterworth Window Springs. Detachable Handle Sad Irons.
Grindstone Fixtures. Waffle Irons.
Patent Saw Clamps. Foot Scrapers.
Patent Floor Jacks. Patent Foot Scraper and Cleaner.
Cistern Tops and Covers. Braiding Machinery for Silk, Worsted
Stair Rail, Store and Fancy Brackets. or Cotton, and for covering
Harness Hooks and Brackets. Whips and Telephone Wire.
Flush Pulls, Small Anvils, Dumb Bells. Fine Castings a specialty.
WORKS AT PROVIDENCE, R. I.
New York Office, 99 Chambers Street.
BOSTON AGENTS—NASHUA LOCK CO.

VARIETY IRON WORKS.
KYSER & REX,
Manufacturers of
Hardware Specialties, Iron Toys, Novelties
and Housefurnishing Hardware,
Main Office and Factory, Trenton Ave. and Margaretta St., Frankford, Philadelphia.
Branch Office, 19 & 21 S. 4th St., Phila. Hardware specialties manufactured to order.

Close-Fitting Fire Doors.

It is a somewhat common notion that air-leaks around the doors on a boiler front, or through the brickwork, or in the flue-cover plates at the back end of the boiler, do not amount to very much in the cooling effect which they produce. It may be hard to say, in exact figures, what this cooling really amounts to, for the measurement of the quantity of air thus needlessly admitted is by no means an easy thing. The area of the crevices may be readily enough determined, but to get the actual or the average velocity of the flow through them is far from a simple process. A useful comparison may sometimes be made of this leakage area with actual clear area between the grate bars, and in some cases that could be cited this proportion would be found surprisingly large.

The utmost care is taken when test trials are to be made that all such leaks of cold air are stopped (and most properly, too), in the same way that search is made for air leaks into a condenser. It is too often the case, though, that when the test trial has been finished this rigid care is laid aside, apparently upon the ground that as the high results of a closely-watched test can never be reached in everyday work, therefore no special pains whatever need be taken, either for careful fixing or for exact conditions of apparatus.

The fact cannot be denied, however, that there is money value, and in a year's time a good deal of it, in the maintenance of the very best conditions of things in all the particulars of which the close-fitting fire door may be taken as the type. A boiler is fired for the purpose of heating the water in it, and every ounce of air that passes into the boiler-setting through leaks of any kind, involves a waste as much as though an equal weight of sand, or any other useless material, were poured in and heated up. This leakage of air, it must be remembered, is constant—all the time running—and even a slight opening in the wall or against one of the front plates, will pass wastefully in the course of a week enough air to represent a very snug little sum in the bills which must be paid for coal. This leakage flow of air into a boiler furnace, it should be remembered, is a very different thing from the admission of air above the fire by an exactly regulated slide or similar device, although even this admission is too often recommended and made in ways that are simply absurd, and which lead to as palpable waste as leaky doors or rickety walls can ever cause. This branch of the subject is supposed by some to be quite complex, and is not often dismissed with few words.

Trade with Russia.

The steamer Lord Collingwood has commenced to load at her pier on the North River, in this city, for Sebastopol and Odessa. She has a capacity for about 2000 tons, and will fill up principally with agricultural implements, about one-half of which will go from leading manufacturers in this State and the other half from Chicago and points West. Orders already received by the agents are a guaranty that a full cargo will be secured, the value of which will not be less than \$50,000. Heretofore shipments for Russia have been made mostly through London and Hull, but enterprise in a new direction seems to have been justified by the results thus far, in the present instance. The implements to be sent to Sebastopol consist of mowers, reapers, plows, trucks, grain drills, binders, tedders, bagging barrels, horse rakes, grain mills, cutting machines, fan mills, corn huskers, saws, syringes, garden tools, &c. The manufacturers concerned manifest some anxiety lest adventures of all sorts rush in and glut the market, which has been considered a very fair one for some years past, and thus by sending implements and tools not suited to the demand, bring American goods into disrepute. The usual method is to "work up" a market by sending out experts, to see exactly what is required, and then to sell "territory," taking good care to protect their customers so far as practicable in exclusive rights. Therefore, applications from local commission merchants for goods might in many cases be refused, except on special conditions. It is predicted that if exports are made without giving heed to the usual precautions, somebody is sure to get hurt. Machinery must be exactly adapted to the wants of the market, as to style and materials. For example, large wooden driving wheels are very well in some climates, while in others iron wheels are indispensable. We learn that the shipping season to the European Continent this year opens with good prospects. Trade is in a healthy condition and gradually increases. With South America, shipments commence later and continue until July. Australia, New Zealand and South Africa are good fields for enterprise.

An important invention, due to the experience of Mr. Anson Atwood, has recently been made, being an improved method of making car wheels. The peculiarity of the method consists in the means adopted to secure the tire to the center, and to cut off metallic connection between the two. The tire is made considerably larger than the center, leaving a space between them. Similar grooves are formed in the inner surface of the tire and the outer surface of the rim of the center, making together chambers into which a hemp packing, so prepared as to be practically indestructible, is driven until the chambers and the rest of the space between the tire and the center are perfectly filled. This hemp packing being forced into the grooves and consolidated by pressure interlocks and firmly holds the tire in its place. It also acts as a cushion, absorbing the force of blows upon the tire, lessening the noise in the cars, and preventing the crystallization of axles. An experiment was tried to determine the amount of lateral pressure necessary to move a tire secured in this manner, and it was found that the tire did not start until the index of the hydraulic press registered over 60 tons. The fact that the parts are put together cold does away with the straining caused by the unequal contraction of metals (as when the tire is shrunk on), and the wheel thus begins its service under more favorable circumstances than it otherwise

would. The life of this wheel is, with three turnings, at least 500,000 miles, after which it is in a fair condition for freight service, or the tire may be removed and a new one put in its place, when the wheel will repeat the work already done. This large mileage and the few turnings needed must make the wheel a very economical one.

The St. Lawrence Tunnel.—Mr. J. B. Rouillard, of Montreal, Canada, has been awarded the contract for the St. Lawrence Tunnel. The contract provides that the work shall be in condition for the running of trains within three years from its commencement, and Mr. Rouillard is positive that the whole will be finished by June, 1885. Preliminary preparations have already been made, and in a few weeks the working plans will be drawn up. The tunnel is to be about 16,000 feet long, 26 feet wide and 23 feet high, and will contain a double track. The greatest depth will be at the middle, where the rails will be about 76 feet below the level of the bank, the gradient from each side to the middle being less than 105 feet to the mile. The tunnel, according to contract, will be complete in every respect. A permanent system of ventilation and drainage will be established and the electric light used. The immense amount of machinery which will be required will be obtained as far as possible from English and Canadian manufacturers. When the work is in full swing Mr. Rouillard expects to have some 500 men employed. The price to be paid for the tunnel complete is \$3,905,000. The syndicate, of which Mr. Rouillard is the representative, is composed of nine gentlemen of various nationalities—Canadian, English and Scotch. Mr. Rouillard himself has considerable experience in this sort of work, having been the constructor of several tunnels in the Rocky Mountains.

Krupp's Works at Essen.—The following details of the Krupp works at Essen are taken from the *Deutscher Submissions Anzeiger*, Berlin: The establishment was founded in 1810 by the father of the present proprietor, and in 1848 it employed 74 workmen. At the present time about 17,000 persons are engaged. There are at work 1542 furnaces, 294 boilers, 82 steam hammers, varying from 2 cwt. to 50 tons; 310 steam engines of from 2 to 1000 horse-power each, giving a total of 12,000 horse-power, and 1622 machine tools. In addition to this, there are 14 blast furnaces, producing 600 tons of pig iron in 24 hours. The average daily consumption of coal and coke (including the blast furnaces and several steamers) is 2680 tons. The transport of the material used in the works employs 23 locomotives, 767 wagons, running on 42 miles of track; 50 horses and 206 carts, while communication between the various departments is maintained by 43 miles of telegraph wires, with 35 stations. The mines belonging to the firm consist of 4 collieries, 547 ironstone mines in Germany, and a large number in the north of Spain. Their daily output is 3000 tons of coal, 1600 tons of iron ore, of which 1200 tons are raised in Germany. The transport of the Spanish ore occupies five steamers belonging to the firm, with a tonnage of 7800 tons.

A pair of engines, for some time past in process of construction at the Buhl Iron Works, Detroit, Mich., for the North Chicago Rolling Mill, are reported to be the largest of the kind in the world. They are now nearly completed and their total weight will be about 230 tons. The weight of the crank-shaft complete is 26 tons; four cylinders, without heads, 24 tons. The two taper pieces connecting the high and low pressure cylinders weigh 11 tons; four pillow blocks average 10 tons each. Four gun-metal cranks weigh 20 tons. There are 5½ tons of brass castings. The steel castings were obtained from Chester, Pa., the principal forgings from Buffalo, and the brass and iron castings were made in Detroit. The engines are of the double compound reversible type, and are connected with cranks placed at right angles to each other. The capacity is 6000 horse-power. The high-pressure cylinders are 42 x 42 inches, capable of sustaining a pressure of 100 pounds to the square inch; low-pressure cylinders, 72 x 42 inches. The main shaft is 22 inches in diameter and the engine is expected to make 150 revolutions, with seven reverses, per minute. The cost of the engine is about \$55,000, and when set with its boilers, air pumps and roll train, its value will be in the neighborhood of \$175,000. The cost of the entire plant and mills of the company is reported to exceed \$2,500,000, and about 500,000 tons of iron ore will be required for this year's work.

The Baldwin Works have given the Pennsylvania Railroad Company an answer as to the time in which the order for sixty locomotives placed with them by the latter company can be completed. The time fixed is the 1st of July, and the Pennsylvania Railroad Company will build 210 locomotives at its own shops during the year.

FLANDERS' PATENT Portable Crank Pin Machine.

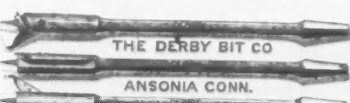
For Turning off Crank Pins in Position and while the Wheels are under Engine.



L. B. FLANDERS MACHINE WORKS,
1025 Hamilton Street,
PHILADELPHIA, PA.

Descriptive circular on application.

CUTTERS WILL NOT BREAK.



THE DERBY BIT CO.
ANSONIA, CONN.

DURABLE, STRONG, CONVENIENT.

PATENTED ARTICLES

MALLEABLE IRON.

Hammer's Malleable Iron Hand Lamps.



Screw, Kerosene Size.

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers, 3 Sizes.

Hammer's M. I. Hanging Lamps.

NEW pattern Heavy Screw Clamps; strongest in the market.

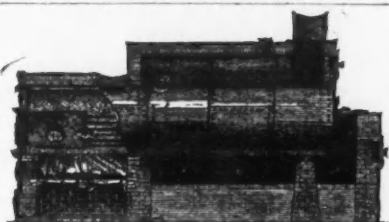
For sale by all the principal Hardware Dealers.

Send for Price List.

MALLEABLE IRON CASTINGS

Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,
Branford, Conn.



BRIDGEPORT BOILER WORKS,

BRIDGEPORT, CONN.

LOWE & WATSON, Proprietors,

MANUFACTURERS OF

The Lowe Patent Tubular Boiler, with and without Superheating Drums. Fourteen years' use proves them the most durable and reliable boiler known. Gives dry steam. The process for combustion of the gases is in the construction and setting. Burns any fuel; obtains as much result from it as any boiler or setting with no more cost, and greater durability.

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LATHES.

Beautifully finished Screw Cutting Lathes, 22 change wheels, on stand complete, \$15. 15/. Bed 30 inches with gap. Apply for list; three stamps.

BRITANNIA COMPANY,

Colechester, England,

Makers of Lathes to the British Government.

Wholesale Agents Wanted in America.

BONNEY'S PAT. PARALLEL VISES.

12 Different Sizes and Styles.

from ¼ to 24 inch

width of jaws, and

in weight from 1 to

2 lbs. Over 200,000

made and sold in the

past four years, with

continually increasing

demand. We are the

only ones making

a line of cheap

small vises in America.

We make, also,

and other goods. Send for Price List.

Farmers', Machinists' and Coachmakers' Vises, and other goods. Send for Price List.

BONNEY VISE AND TOOL CO., 3015

Chestnut St., Philadelphia, Pa.

P. S.—We furnish stands for holding full lines of the 12 Vises.

A. F. PIKE.

Pike Station, New Hampshire,

Manufacturer and Wholesale Dealer in

Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.

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Genuine Old Reliable,

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White Mountain,

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The New Boss,

Imperial, Eagle,

Willoughby Lake,

Green Mountain,

Black Diamond,

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German Pattern,

Chocolate, Az Blue,

Stones made, labeled and branded in any style desired. Prices and quality guaranteed. All the above brands are of clear, k. on grit and will not glaze.

DRILL PRESSES.

New Upright Power

Drill Presses; swing 22

inches, back geared,

quick return motion;

large steel Spindle, bal-

anced in column; re-

volving Arm and Table;

cut Gears; Pulleys, 9 x

2½; a strong brace ex-

tends from base to col-

umn, stiffening it at

point of greatest strain.

—a new feature. Weight,

100 lbs.; height, 6 feet.

Price, \$210. Small size,

swing 13 in., lever feed,

three speeds; light and

loose pulleys (no coun-

tershaft required). Price,

\$85.

Peerless Punch & Shear Co.,

115 W. Liberty Street, New York.

GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

ALL PURPOSES.

351 to 353 Cassen Ave. Brooklyn, N.Y.

WE ARE CARRYING IN STOCK

THE WELL-KNOWN BRANDS OF

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ROOFING PLATES,

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ALSO,

THE STANDARD CHARCOAL

BRANDS (PRIME AND WASTERS) OF ROOFING:

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TIN PLATES, METALS, SHEET COPPER, SHEET BRASS, &c.

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CLIFF & BECKMAN STS., NEW YORK.

BUFFALO CHAMPION ICE CREAM FREEZERS.

FOUR STYLES.

FIFTEEN SIZES.

THE BEST
ICE CREAM FREEZER
IN MARKET.

Please send for Illustrated and Descriptive Price List.

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PROPRIETORS

BUFFALO STAMPING WORKS,

BUFFALO, N. Y.,

AND

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NIAGARA STAMPING & TOOL CO.,

Manufacturers of

Presses, Dies and Tools for Working Sheet Metal,

FRUIT CAN AND TINNERS' TOOLS, &c.

Works, 147 and 149 Elm Street, near Clinton Street, BUFFALO, N. Y.

JACK SCREWS,

Press Screws, &c.

Cast with Perfect Seamless Thread by our new patent process.

Cheaper than Wrought Iron, not so apt to bend or strip the thread. Liberal discount to the trade.

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For R. R. use
(under Hot Boxes).

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THE AMERICAN TACK CO., Fairhaven, Mass.,

Are making TUFTING BUTTONS with every Eye Soldered to its Back, giving them great Strength and Durability. All Buttons are guaranteed satisfactory. Also Lining and Saddle Nails, and every variety of

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SABIN MFG. CO.,

MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors,

Send for Catalogue.

The Iron Age Directory

and Index to Advertisements.

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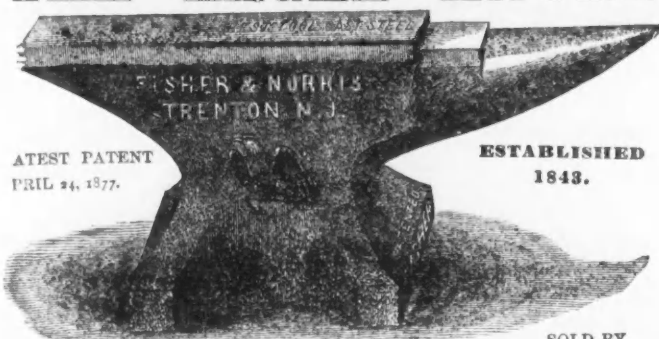
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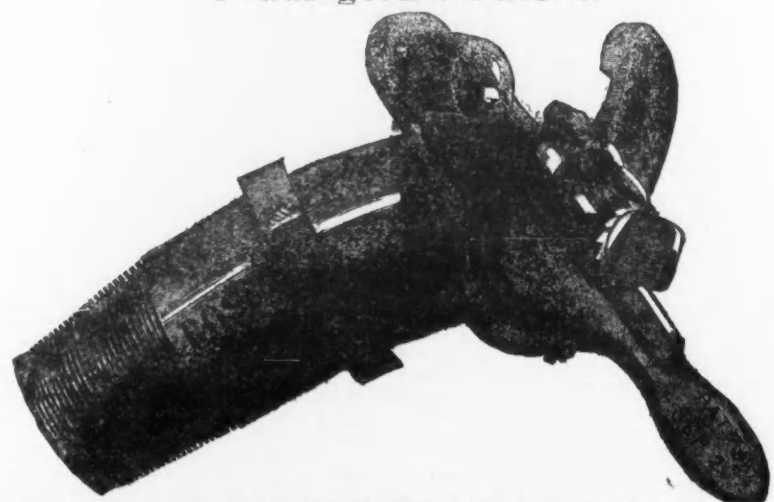
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ESTABLISHED
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The only Molasses Gate made with RATCHET on TIGHTENING SCREW, to secure a regular pressure, and hold it securely so as to prevent leaking.

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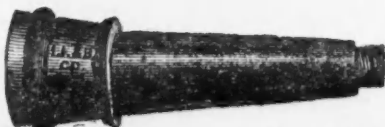
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(Patented October 13, 1881.)
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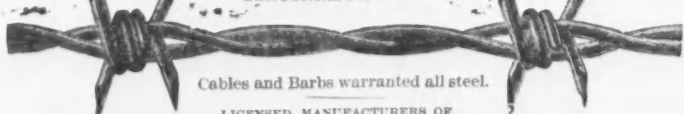
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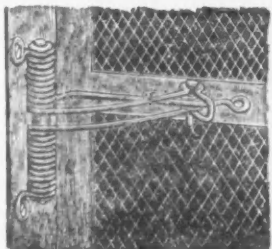


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LICENSED MANUFACTURERS OF

FOUR-POINTED BARBED WIRE FENCING.

We have large stock of Galvanized, Red and Brown Painted Barbed Wire on hand, and can fill all orders promptly. Send for sample and prices.

**THE SHRODER DOOR SPRING.**

The BEST DOOR SPRING in the MARKET.

It will hold a door open as well as shut, and by its peculiar form has four inches more leverage to hold a door shut, closing it tight, where all other Springs fail. No latch required with this Spring.

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WARRANTED!!

Better than the Best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

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This Bit will bore through all hard, knotty or gummy woods without being withdrawn. The worm will not clog, owing to the continuance of the channel of the Bit to the extreme point of the worm, enabling it to cut its way and clear itself of shavings, but not injuring its qualities as a screw. This improvement is applicable to any size Auger or Bit having a worm or spur. Dealers, send for price-list for getting stock on hand (stating quantity and sizes) and for the Gladwin Bits.

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The Turner and Seymour Mfg. Co. have been longer in the business and make a greater variety of Cast Iron Scissors and Shears than any other concern in the world. Our

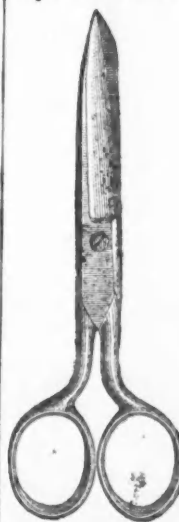
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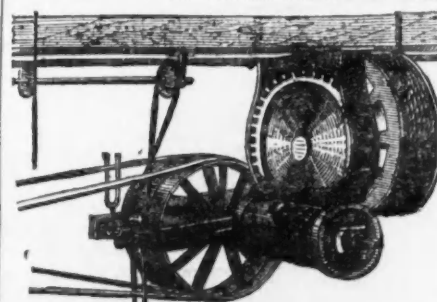


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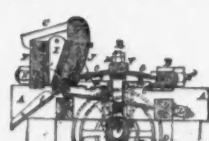
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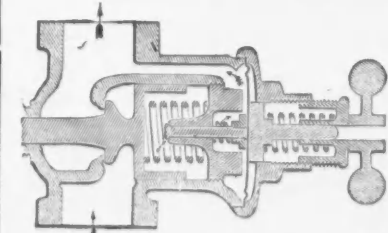


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Patented Nov. 18, 1879.
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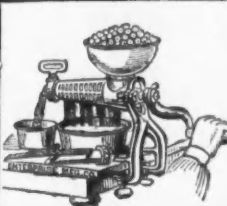


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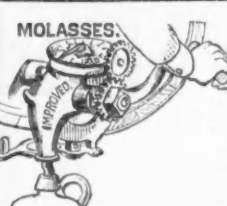
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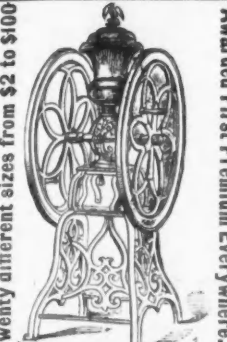
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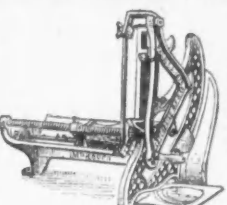
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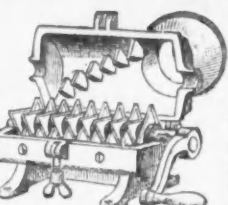
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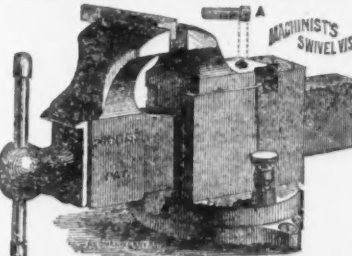
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 2 1/2 in. screw..... dis 60 10 1/2
 3 in. screw..... dis 60 10 1/2
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 18 in. screw..... dis 60 10 1/2
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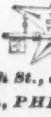
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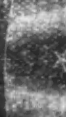
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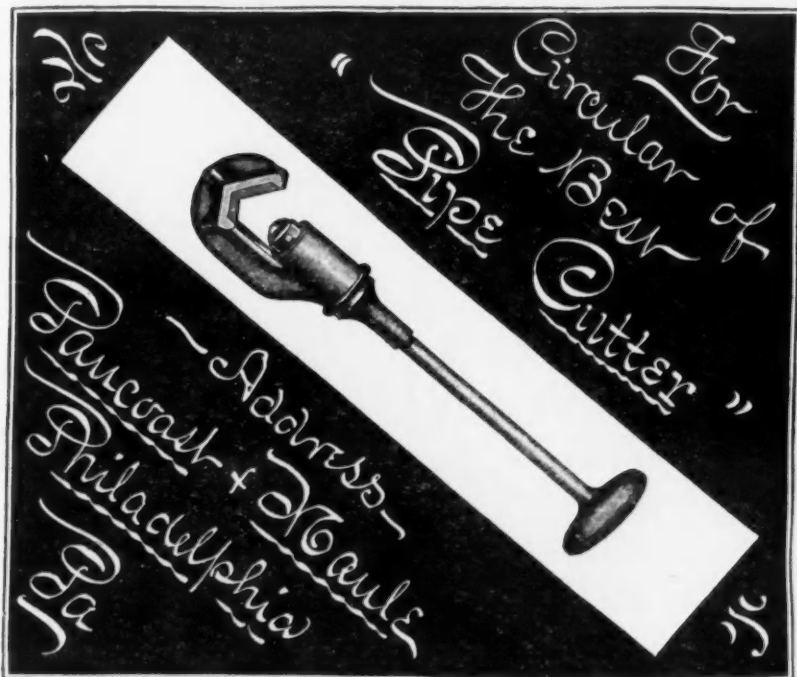
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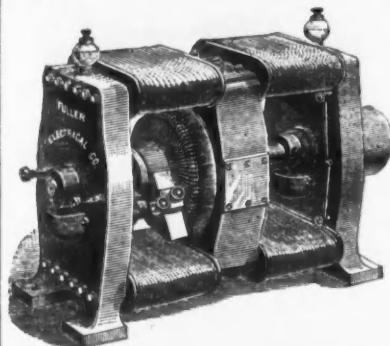
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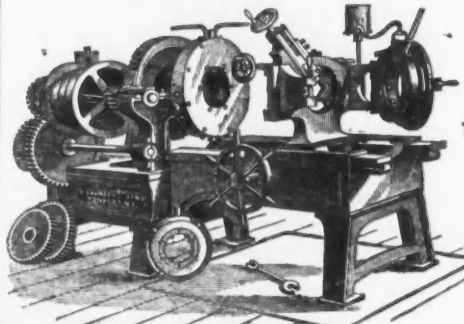
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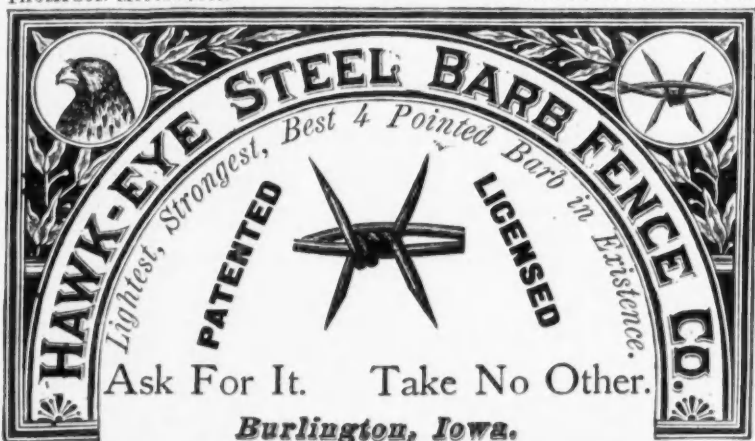
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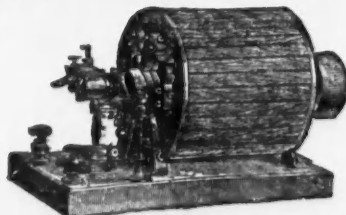
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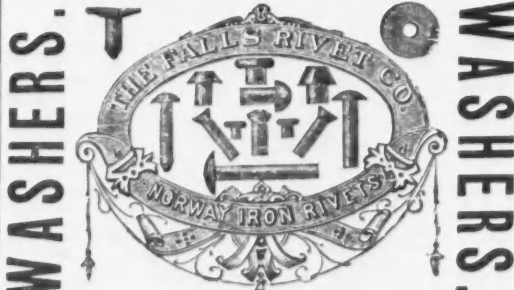
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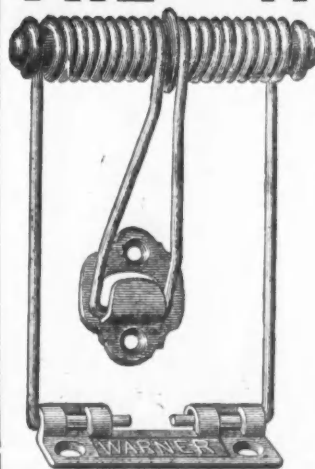
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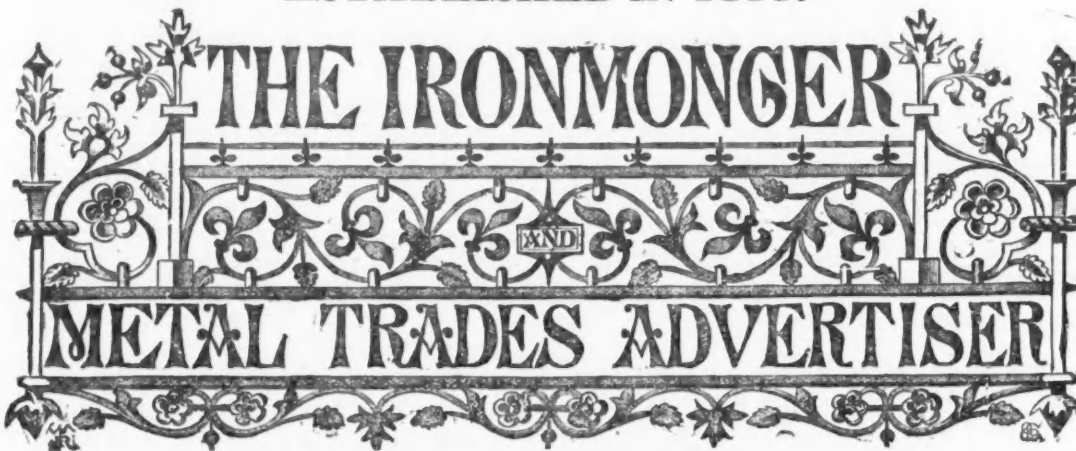
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FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

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With which is incorporated The Universal Engineer,

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This Supplement is published in

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so far as the experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Address List inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

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KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
Front and Laurel Streets, PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1870.

Fig. 2.

Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad
or Telegraph Company
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.

DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON & SONS.

BROWER & LEEDS,

No. 81 Murray Street, New York.

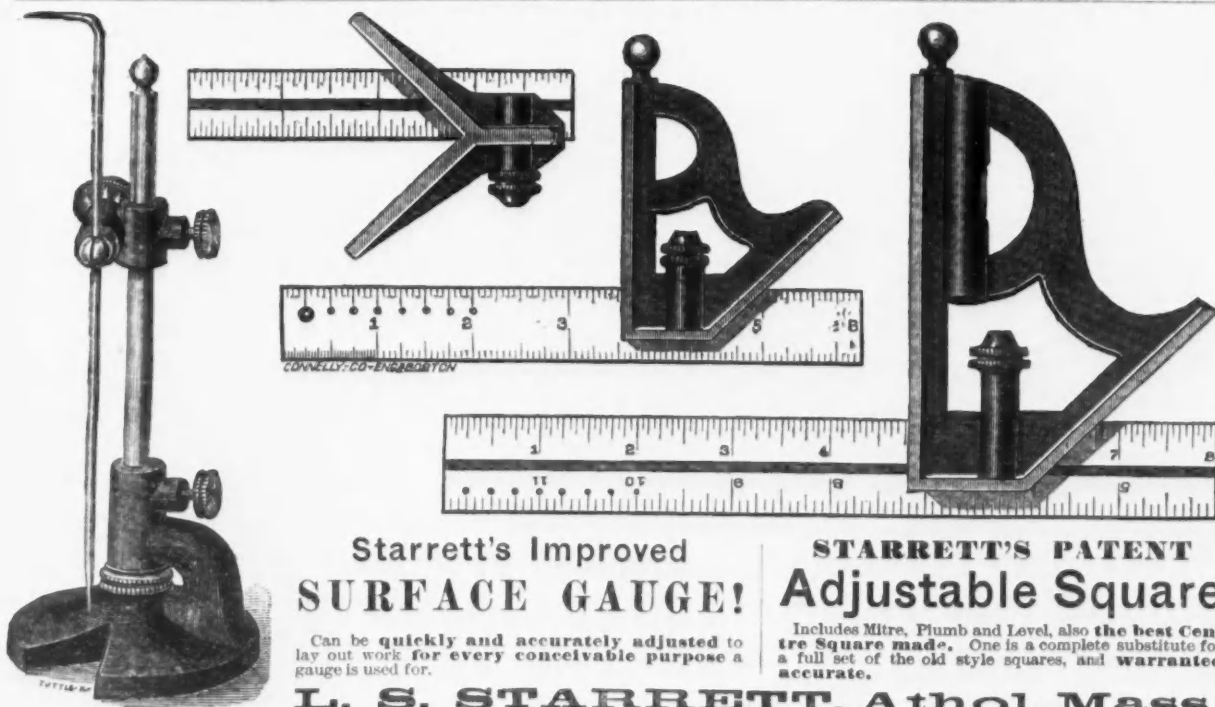
Hardware Manufacturers' Agents, and Headquarters for

HORSE SHOES, HORSE NAILS, TOE CALKS, CALKING STEEL,

Bayliss' Bellows, Forges and Tuyeres,

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FITTING AND DRIVING HAMMERS,



Starrett's Improved SURFACE GAUGE!

Can be quickly and accurately adjusted to lay out work for every conceivable purpose a gauge is used for.

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Includes Mitre, Plumb and Level, also the best Centre Square made. One is a complete substitute for a full set of the old style squares, and warranted accurate.

L. S. STARRETT, Athol, Mass.
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Send for Catalogue.

FRASSE & CO., Agents (P. O. Box 879), 62 Chatham St., New York.

CAUTION.

This is to inform the public that since the success of my Patent Squares has become known, unprincipled parties have had the foolhardiness to make them, under the Pretext of Chaplin's Patent. Having commenced suit against said parties, I shall soon put a stop to their manufacture, and shall hold all selling or using them responsible. Respectfully,

L. S. STARRETT.

R. P. SCOTT & CO.,
25 Orange Street, Newark, New Jersey,
Manufacturers of
ROTARY KNIFE PEACH PARERS, GOLD MEDAL APPLE
PARERS, SAFETY REVERSIBLE ICE CREEPERS, EGG
BEATERS, MELTING LADLES, &c. Also,
Scott's Peach-Pitting Machines.

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NO MORTISING OR TENONING, CANNOT SAG OR WARP,
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Amesbury's Band Saw Filing Machine.

Will Save its Cost in a Few Weeks.

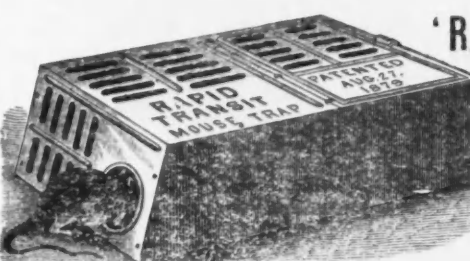
Any boy that can turn a crank can file a band saw in from five to ten minutes more accurately than an expert filer can do the same by hand in one hour. Keeps the teeth even and level, and enables the saw to do more and better work with much less strain. Pronounced by users to be the best labor-saving machine ever introduced.

First Premium and Diploma
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BEST BAND SAW FILING MACHINE.

Is sold at a price within the reach of every one using a band saw. Reduced price list.—Net price, including 20 files, 32 : thin, corner and facing files, per dozen, \$1.20; thick beveled files, per dozen, \$1.50. Terms strictly cash. Send for Catalogue and Testimonials.

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Samples sent free for 30 cents.



The verdict of all: "The best in the market."

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THE "MOUNT CARMEL" OX SHOE.

Steel Toe Calk.

FINISHED READY FOR NAILING ON.

WARRANTED

The Best and Cheapest Shoe Made.

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For sale by dealers in blacksmiths' supplies.

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Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano
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Correspondence solicited for all kinds of castings.

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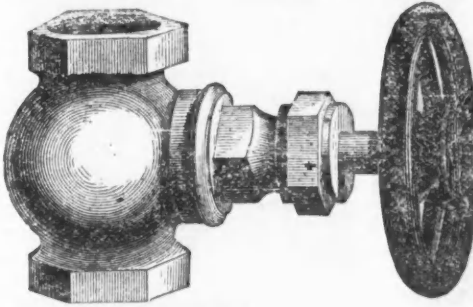
Quartz, Pumice and Rotten Stone, Crocus, Rouge, Glue, Sand
Paper, Emery Paper and Cloth, Emery Wheels, &c.

WALPOLE EMERY MILLS,

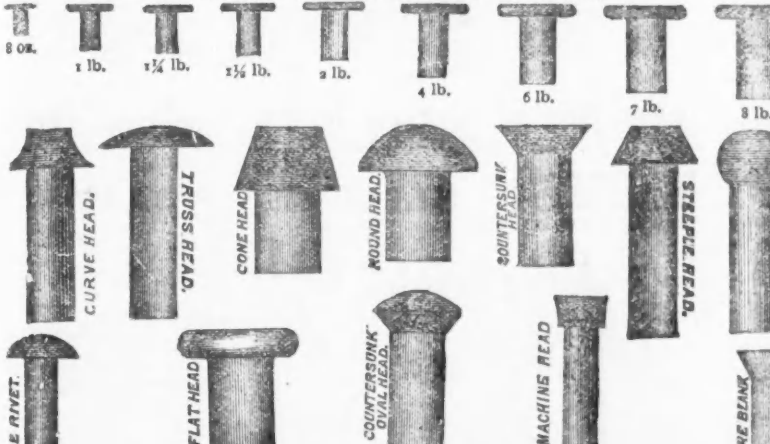
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8 oz. 1 lb. 1 1/4 lb. 1 1/2 lb. 2 lb. 4 lb. 6 lb. 7 lb. 8 lb.

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ALL KINDS OF
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Sole Manufacturers in U. S. A. of our Cele-
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**METALINE
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Send For Illustrated Catalogue.
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WEYMOUTH'S PATENT.
This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bales, cutting corn stalks for feed, cut-
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The blade is best cast steel, spring temper, easily sharpened, and is
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They are nicely packed in boxes, one dozen each, of 30 pounds weight,
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MANUFACTURED ONLY BY
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East Wilton, Franklin Co., Maine.
For sale by the Hardware Trade generally.




NORWAY IRON CARRIAGE & TIRE BOLTS.
Axle Clips, &c.
Only Medal, Phila., 1876.
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Celebrated Patented Furnace Charging Scale.
TAKES HIGHEST PREMIUM WHENEVER EXHIBITED.
INDEPENDENT BEAMS. EACH BEAM IS NUMBERED
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POISES ARE KEVED AND CANNOT SLIP.
NO JUMPING OUT OF BEAM.
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THE STRONGEST AND ONLY PERFECT CHARGING
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Blaisdell's Patent Upright Drills,
With Quick Return Motion.
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Of all Sizes to any Length.
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Manufactured by
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Manufacturers of Nail and Spike Machines, Boils,
Nuts, Washers, Rivets, &c. Castings, Forging
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OFFICE & WORKS, Railroad St. near 28th., Pittsburgh, Pa.
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Manufacturers of

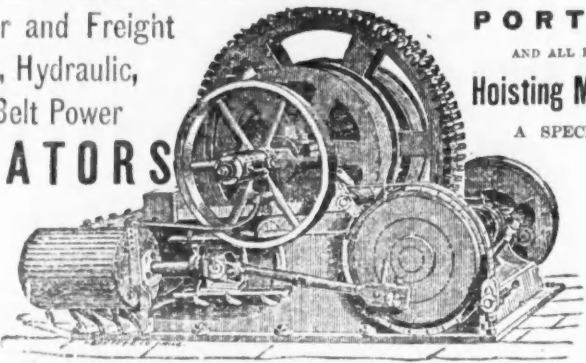


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FROM THE LATE
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Of Lathes and Planers.
Mr. Wright having formerly been a contractor
in building the same, will give superior work to all
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Gear Cutting a Specialty,
237 Water Street,
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Passenger and Freight
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PORTABLE
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Hoisting Machinery
A SPECIALTY.

IRON FURNACE HOIST.

For Handling Stock to Top of Stack with One or Two Platforms.
STOKES & PARRISH, 3001 Chestnut St., Philadelphia

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1977 NINETEEN HUNDRED SEVENTY-SEVEN **1977**
MACHINES
BOTH NEW AND SECOND-HAND

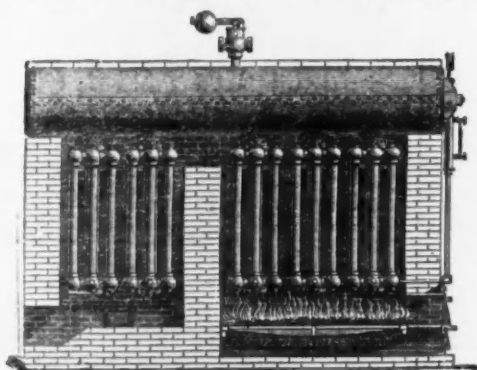
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MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT AND HOR-
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300 HORSE POWER. **S.C.F. & CO.** LOCOMOTIVE FIRE-
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PRICES ANNEXED.

Send stamp for same. In our List No. 23. [stating what you want.]
**We have the Largest Assortment of Machinery to be
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Works and Main Office, **S. C. FORSAITH & CO.**
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DUPLUX SAFETY BOILER.



Unequaled Economy.

Positive circulation, insuring un-
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No sediment. The best materials.
No joints, but expanded joints in
combustion chamber.

The most durable boiler made.
Send for circular.

DUPLUX SAFETY BOILER CO.,

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Chicago Office,
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AJAX METALS,**

FOR
LOCOMOTIVE, CAR, ROLL NECK AND
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PUMP RODS, VALVES AND PLUNGERS,
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Furnished in Ingots or Castings.

Sheet Metals a Specialty.

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SOLE MANUFACTURERS
AJAX Metals, Maxlin's Improved Gas
Machines,
BARTON'S PATENT STOP VALVE.
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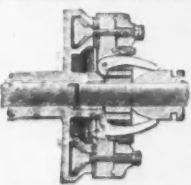
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Economy of Fuel, with increased capacity of steam
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The same principle as the SIEMENS PROCESS OF MAKING
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Will burn all kinds of Waste Fuel without a blast, includ-
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Send for circular.

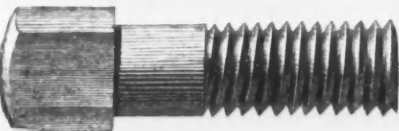
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Hoisting Engines & Elevators Safe, Durable and
Reasonable in price.
Friction Clutch Pulleys and Cut-off Couplings.

We manufacture the "Giant Friction Clutch Pulley," known as the "Captain."
Is the BEST IN THE WORLD for connecting the gearing of calender rolls,
hoisting coal, logs or freight. Our Clutch can connect any amount of power, at
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Is easy to ship and unship; in fact, this is the only Clutch that can do heavy work
satisfactorily.

D. FRISBIE & CO., 123 N. Fourth St., Phila., Pa.



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Manufacturer of

SCREWS, NUTS & BOLTS,

Piano Hardware, Agraffes and Novelties in Metal.

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IRON, STEEL & BRASS

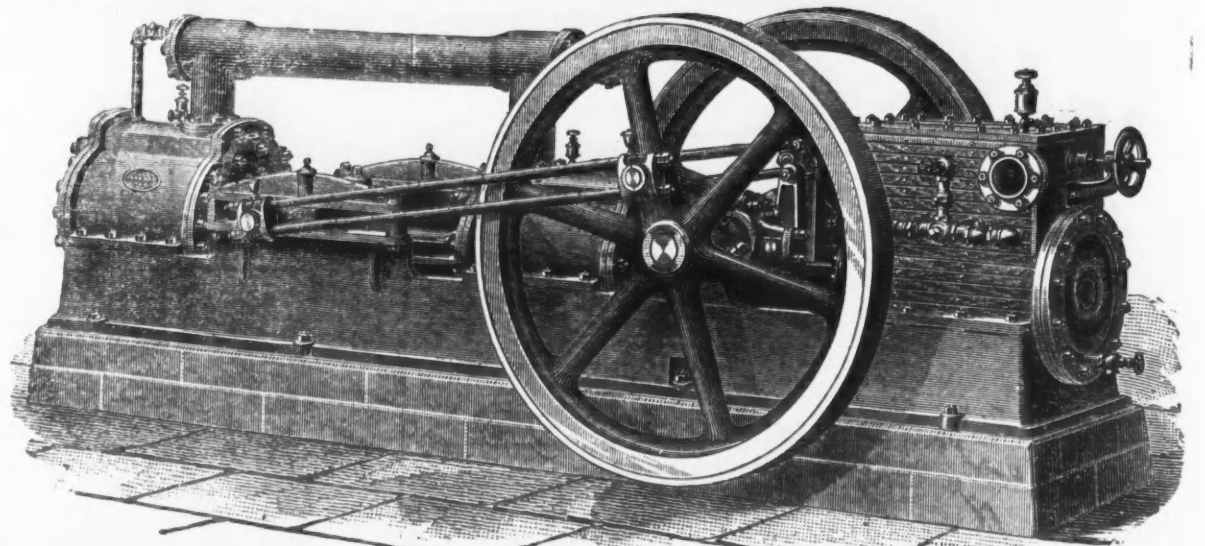
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21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. 2 to 20 Spindles.
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HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

Air Compressors.



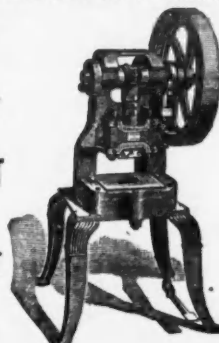
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Also Manufacturers of
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FOR
WORKING SHEET
METALS, &c.
FRUIT & other
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John Streets,
BROOKLYN, N. Y.,
U. S. A.

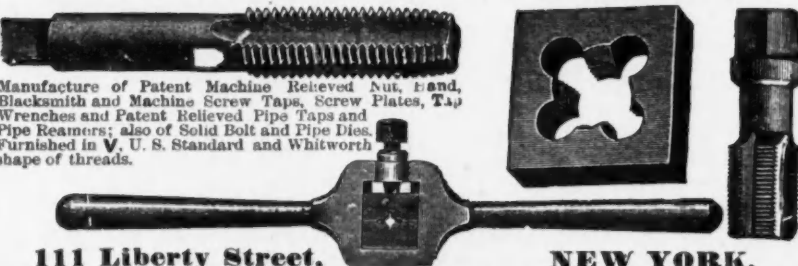


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PARIS EXPOSITION, 1878.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE HORSE TWIST DRILL AND MACHINE CO.'S



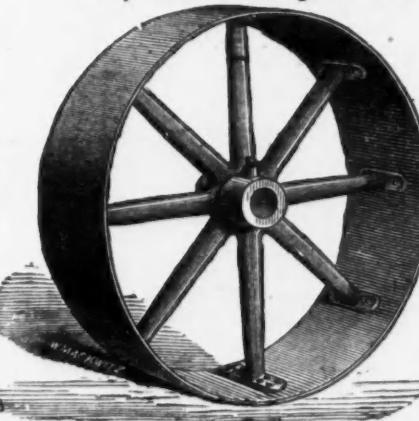
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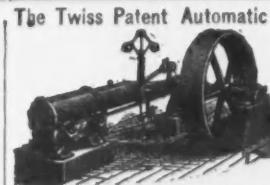
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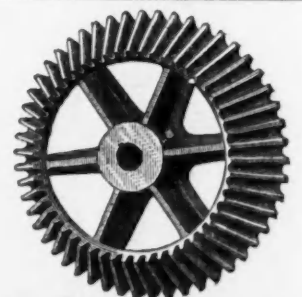
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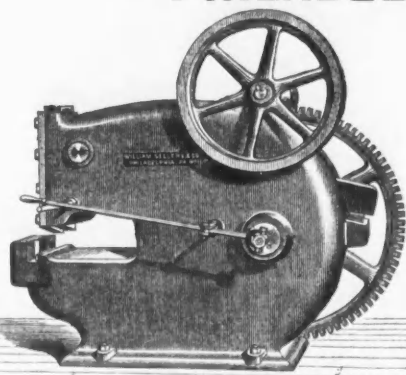
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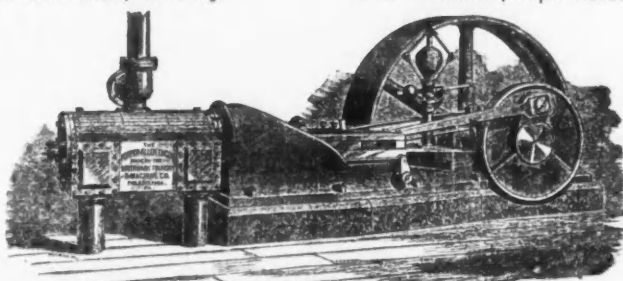
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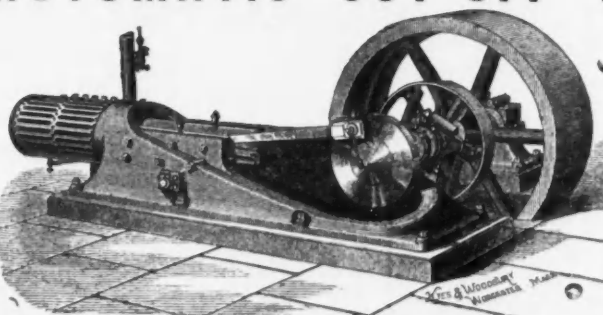
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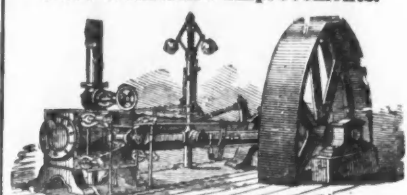


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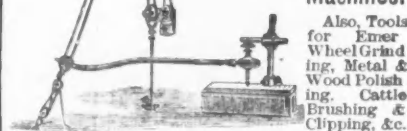
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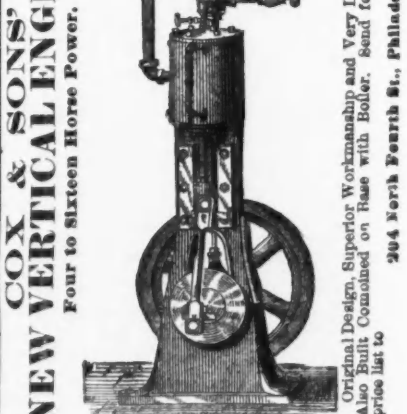
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